THE

DENTAL TIMES,

A

QUARTERLY JOURNAL

OF

DENTAL SCIENCE.

EDITED AND PUBLISHED BY

THE FACULTY

OF THE

Pennsylvania College of Dental Surgery.

VOL. VII.

PHILADELPHIA:
1870.

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DENTAL TIMES.

VOL. VII. PHILADELPHIA, JULY, 1869. No. 1.

Original.

DENTAL HYGIENE.

BY SAMUEL WELCHENS, D. D. S.

[Read before the Pennsylvania State Dental Society, at Harrisburg, June 8th, 1869.]

The importance of a good hygienic system in the several branches of medicine cannot be over-estimated. To preserve health should claim the attention of science, fully as much as the means of restoring it when impaired or lost. The physiological relations of the various parts of the human structure are so nicely balanced, while the elements of life and death are in such close proximity, striving continually for the mastery, that the highest attainments in professional skill, and the broadest and most comprehensive experience should be brought into requisition, in order to keep the phenomena of *vital activity* in channels of health and happiness. *Dental hygiene,* though to some extent a specialty, partakes in a very large degree of the element of dependency. It involves some of the most important functions, and must, from the very nature of the case, be conditioned and influenced by the general laws of the economy.

The capillary network, which derives its nourishment from the systemic circulation, constitutes the source of vitality to the teeth, and to keep it in an active, healthy condition, so as to perform its functions properly, and build up and establish those hard unyielding structures, and develop, in the process of growth, a strong and enduring denture, is the subject of our present inquiry.

The human teeth are of that class of organs which are not in any direct relation with the blood-vessels, and yet which derive their whole nutriment, and the materials of their functional operations, from the blood. In all other respects they are almost a separate and distinct creation. They begin to form, and become developed, when all the other organs are already faithful to the wants of the economy, and are destroyed by disease and decay with but little serious inconvenience to the system.

While they are regarded as the hardest organic substance known, hey are by no means the most durable. By their superior structure, they were evidently intended by nature to withstand all the wear and tear of mastication. But, apart from this, they are destined to sustain shocks and trials from internal derangements and external abuses, so that the office allotted to them is performed between two most powerful engines of destruction.

The rule seems to be, so far, at least, as external usage is concerned, neglect and violence; and, where this is not directly the case, with regard to the teeth, their low vital powers are driven in upon themselves from the surface, by some congealing agent, or raised to a state of inflammatory excitement by acids and corrosive applications, fully as destructive to their general health.

This kind of abuse is a fruitful cause of decay, but it obtains as much among those who are scrupulously cleanly, as those who are careless and filthy; so that the popular theory that the decay of those organs is caused solely and entirely by external agents is, for the most part, erroneous.

Our purpose, in this paper, is to combat this theory, and maintain that the cause of decay in the teeth is attributable to internal derangements and an insufficiency of capillary nutrition, fully as much, if not more, than to careless habits and the various causes of external abuse; not, however, for the purpose of disparaging sanitary measures, but to direct, if possible, attention to the internal—so that our hygienic principles may apply and benefit the race from both stand-points and in both theories.

I hold that there are three several conditions of the economy, in which it is possible to so derange the functional powers as to superinduce a corresponding derangement of the capillary nutrition in the tissues; and the complex organic nature and structure of the teeth being such as to deprive them of a rapid recuperative action, *stagnation*, leading to *decomposition and decay*, is the result.

The first of these conditions is that pathological state produced by mesenteric derangements and eruptive fevers incident to child-bed, whereby there is an undue consumption of capillary nutrition, and an inability on the part of the tissues to appropriate proper aliment, which produces not only weak and delicate teeth, about the time of their formation, but the unsightly deformity of what is termed *dental atrophy*.

The second condition is an enfeebling or weakening process in the systemic circulation, by which the function of assimilation is retarded or defeated altogether, especially in the hard tissues of which the teeth are composed, and thus rendering them soft and liable to disease and decay.

The third condition or element of decay in dental tissue arises from an undue acceleration of the local circulation, producing active congestion in

the soft tissues, a gorging or choking of the vesicles by a too rapid interstitial deposit of the mineral substances, designed by the economy to harden the teeth.

The foundation of a building, or the fountain-head of a stream, must possess the ability to sustain that which depends upon it. The root of a plant must have absorbing surface to supply the wants of the stem and leaves. These are *axioms*, which will readily illustrate the absolute necessity of sufficient vital energy in the circulating system of the animal to supply a proper amount of nutriment to stimulate the entire capillary maze.

In all organic structures there are central or vital organs which supply functional power to those which are thrown to the surface, and the arrangement is always to have those organs deeply seated for their own protection, and that each succeeding strata of the fabric, as the growth is outward and upward, becomes more complex, and consequently less liable to injury, but at the same time less capable of recuperating their power when injured.

This general law of the economy is well-settled and most beautifully illustrated in the arrangement and formation of the human teeth.

The "*cementum*" or "*crusta petrosa*," the "*dentine*" and the "*enamel*" constitute the three several divisions of the dental tissue, and the arrangement gives the *cementum* the position nearest the vascular tissue, because of its better adaptation to hold the fluid thrown in from the blood to be imbibed by the capillaries of the more highly organized structure of the *dentine*. And then, again, the *enamel* being still more dense, and less liable to injury by reason of its low vital organization, comes boldly to the surface, and finishes the grandest structure of the animal economy.

The cementum contains about one-third per centum of animal matter, thus rendering its "*lacunæ*" and "*canaliculi*" capable of retaining, and, to some extent, elaborating, the fluid which is secreted from the *periosteum* to nourish the *dentine*, by the process of *endosmosis*, or *imbibition*. This structure, then, is that which holds the destiny of the entire tooth. The ability of the organism to keep the *dentine* in a healthy state by preserving a proper vital balance, is the very pith of our subject.

The dentine is, perhaps, the most delicately organized fabric within the entire range of the economy. Its capillary vesicles contain a fluid composed of the finest particles of the blood. This fluid is laden with the azotized compounds designed by nature to build up the tissue, and by virtue of its extremely delicate and sensitive character, it is easily influenced, either to a healthy, vigorous action, by a proper functional stimulant from the systemic circulation, or it can be disorganized, either

from the want of such a stimulant, or a too rapid interstitial deposit of its particles. These changes can take place through disease, a feeble organization, or external abuses.

In marasmus, catarrh fever, measles, or any of those diseases incident to childhood, the integrity of the blood becomes destroyed, capillary circulation and nutrition are interrupted and deranged. And when they are contracted about the time of the formation of the dental tissue, there is an insufficiency of mineral matter for a perfect development of the teeth, and especially of the enamel, and the result is that hideous malformation termed "*dental atrophy*." Or a lack of *vital energy* may be superinduced from the same cause, and though there may be material enough to form a beautiful pearly denture, the organization does not go on vigorous enough to make it strong and enduring, and a soft chalky *enamel*, with a corresponding enfeebled *dentine*, is the result.

Sometimes, too, those pathological conditions are entailed from parent to child. This consumption of vital energy, and of capillary nutrition, thus becomes congenital, and that which is lost by the parent can never be regained by the child. The teeth always become involved in those defections, and can never be rendered strong and enduring in texture.

These are pathological conditions of the system, many of which must be allowed to run their course, and do their work of destruction. All the dentist can do is to apply his artistic skill, either in treating the natural organ, or supplying an artificial denture—there being no system of dental hygiene fully equal to the task.

We will therefore turn to our next element of inquiry.

An insufficiency of capillary nutrition, from whatever cause, will have a more damaging effect upon the teeth than any other part of the capillary system. A derangement of this sort in the epithelial and epidermic, and also the articular cartilage vessels, can be more rapidly overcome, by reason of the flexibility of their walls, and their adaptation to the laws of tolerance, pervading the entire structure. But the denser and more highly organized fabric which composes the teeth, is not possessed of such rallying power, and consequently must suffer injury corresponding to the amount of damage to the other tissues, done by such irregularity; and, not being able to recover as rapidly as the softer tissues, the injury multiplies—disintegration is followed by disorganization and decay.

The operation of nature in the vegetable kingdom is analogous to this, and will serve to illustrate the idea we wish to present. So long as the root of a tree promptly answers the demands of the trunk and the leaves, all goes well; but when this supply fails, the foliage begins to flag and droop, and if this exhaustion proceeds beyond a certain point, the leaves wither and perish. If there is a deficiency or an irregularity of the absorb-

ing surface of the root, it may not destroy the entire foliage, but, "leaf by leaf it will droop and die." The teeth *can decay*, and in a majority of cases *do decay*, from similar circumstances.

The causes, in every instance of this deficiency of "*capillary nutrition*," cannot be discovered. It occurs in all grades and ages of the human race, and does not escape the robust and healthy any more than those who are constitutionally delicate.

Irregularities in the capillary circulation have been noted when the systemic circulation was in perfect condition. They are most frequent, however, when the heart's action is enfeebled or partially interrupted. And this can occur, and most generally does occur, through some of the abuses of the system incident to our modern mode of life. Dissipation, exposure, sudden and extreme changes in temperature and habits, improper and insufficient diet, tight lacing, careless and filthy living and customs, are among the primary and principal causes. Each and all of these irregular habits of life may produce great and sudden variations, either in whole or in part of the capillary network — the circulation taking place with diminished rapidity in one part, and increased energy in another, though both are supplied by the same trunk. These are not the results of a chronic pathological condition of functional power, but a sequence of their neglect and abuse.

Go into the candy shops, the fashionable hotels and boarding houses, and see the amazing consumption of dainties, well calculated to disturb the normal condition of the system, and, instead of being aliment for a healthy development of the tissues, they produce those debilitating results. Go into the festive social parties, and the brilliant entertainments and balls where so many of the young, particularly in our larger cities, almost live in seasons of gaiety and fashion—where the action of the larger organs is destroyed, and the functional power of the systemic circulation is retarded, and the vital energy of the system is driven back upon its centre by the half sufficient dress, the congealing efficacy of a piercing atmosphere, and unseasonable hours peculiar to such a life. Go into the haunts of vice and dissipation, and mark the manner in which this grand human structure is abused by those whose interest it is to preserve it, and you have a solution at once of the problem we are endeavoring to solve.

But come home, and see whether your little son or little daughter is not suffering the same loss of capillary nutrition and functional energy by close confinement, either in the house or at school, or by the use of too many candies, too much ice cream, or by being over-fed at table with too much sweetened bread and a corresponding round of rich pastry and dainty dessert, without a balancing supply of the more solid food. Here it is that "*dental hygiene*" should interpose its gracious offices, to regulate these

dissolute habits. Insist upon proper treatment in the case of children, and thus re-establish that measure of vital energy which our race is rapidly losing, by not knowing exactly how to live.

We may, however, be pointed to a class of people whose habits in life preclude the idea of their participation in any of those scenes of exposure and dissipation, or whose children are rarely indulged as above intimated, but yet where there seems to be fully as much decay in the dental tissues. Look at our sturdy farmers and woodsmen, and the suburban laborers and mechanics throughout the country. They and their children are, for the most part, strangers to those excesses, and seem to be the very embodiment of robust health and manly development, and yet they come into our offices with as much dental distress as those above enumerated.

With this class of people *sanitary measures* will go far, very far, toward a propitiation of dental decay, and in perhaps the majority of cases will prevent disease until there is a proper development and enduring texture produced in the tissues. But, with all the care that can be taken, all along through life, at every stage and period, they are confronted with the stern reality of an *exposed* and *aching pulp*, through the decay and breaking in of the crowns or walls of the teeth. Can all this be said to be the result of external agencies and injuries *alone?* May there not, after all, be some cause of a character purely and entirely *internal* from which such results may obtain?

We answer, that we believe that there is, and the theory which we hold on the subject will claim the principles we design to discuss in our third and last proposition, namely: the liability of teeth to decay through an undue acceleration of local or capillary circulation, from which there is a gorging or choking of the tissues, thereby interrupting functional power, and producing results similar to an enfeebling insufficiency of capillary nutrition.

In the tree, in the vegetable kingdom, for example, in seasons of active vegetation, leaves may be observed to wither, die and fall off, notwithstanding the fact that the foliage seems strong and vigorous. This is the result of an undue acceleration of the circulation of the sap. Those leaves become gorged and choked by a too rapid deposit of the saline and earthly particles designed by nature to build up the tissue, and their destruction is the result of this arrest of functional activity.

"The blood, when circulating through the *systemic* capillaries, yields a portion of its oxygen to the tissues it permeates, and receives from them carbonic acid. On the other hand, when passing through the *pulmonary* capillaries, it gives up its carbonic acid to the atmosphere, and imbibes a fresh supply of oxygen. Now, if either of these changes be prevented from taking place, a retardation, and even a complete stagnation of the

blood will take place, the flow through the capillaries being now resisted, instead of accelerated, by the relation which the blood bears to the tissues."

"The change in the condition of the blood, in regard to the relative proportions of its oxygen and carbonic acid, is the only one to which the pulmonary circulation is subservient; but in the systemic circulation, the changes are of a much more complex nature—every distinct organ attracting to itself the peculiar substances which it requires as the materials of its own nutrition." An acceleration when undue and abnormal, of this character, is known as "*active congestion*," or "*determination of blood.*" In the softer tissues these pathological conditions can be arrested before inflammation or stagnation sets in; but in the denser or bony tissues, and especially those forming the teeth, the remedy cannot be applied; the interstitial deposit cannot be corrected or reduced to a normal standard, and a stagnation is the result, which finally produces disorganization and decay.

These changes in the capillary circulation may not indicate distress in any of the larger organs, or their functions. The system may be entirely free from any diseased condition of the vital forces. But as the individual, standing upon the shore of a river, may drink in miasmatic poison from the grateful breeze that fans his over-heated and sweated brow, so may those hard unyielding organs receive the seeds of decay and death in the very flow of life and spirits which bring the glow of health and beauty upon the cheek by the extending walls of the capillary maze, which allow the red corpuscles of the blood to come to the surface by reason of an acceleration of the circulation.

It is rarely, indeed, that the diseases of the teeth can be traced to such delightful surroundings, or such fine robust conditions. But is the fact not apparent, at every step of scientific research, that the elements of life and death are not only running side by side continually through our veins and arteries, but that every step in life, and every phase of enjoyment, are beset with dangers which sometimes suddenly lead to the grave.

Here "*dental hygiene*" is at fault. The dentist, however skillful and thoroughly scientific, must stand abashed before these freaks and mandates of nature, and ply his skill in operations upon the diseased organ, or allow the work of decay and death to run its course, and restore the function by an artificial denture. These results do not flow from the same causes, before enumerated, and consequently cannot be met by the same hygienic treatment; but they confront us at every step of our experience in active practice, and, therefore, demand our attention.

Perhaps the best and simplest definition of the idea of "*dental*

hygiene" may be found in the phraseology, "*raise the teeth*," as you would raise a child or a tender plant.

Observe all the rules known to what might be termed a *sanitary regime*, and you meet the demands of the economy, so far as external causes and agencies are concerned. This treatment goes very far toward a good development of the dental organs; but, as we maintain that the cause of decay is not at all times of this outward character, this kind of treatment *alone* is not sufficient. To raise a child well, the process of ablution is not all that is required. There are laws and principles, the observance of which is not only necessary to a healthy growth of the system, but to regulate the habits, the diet and appetite, and a good mental and moral development of the faculties are all necessary. Good substantial food, containing all the elements necessary to build up and nourish the various tissues of the body—clean, warm clothing to protect the surface from the chilling blasts of winter, and regular out-door exercise—all, with temperance and moderation, will not only raise the child well, but, in a large majority of cases, *raise a denture* well calculated to withstand the changes of life, and endure the wear and tear of mastication.

We cannot crowd all the out-croppings and freaks of nature into an easy subserviency to hygienic laws; but in the main, with the deeper intuitions of observant and well-balanced minds, every community can be so educated to general principles as to aid, through popular sentiment, an improvement in the general physiological status of the race.

All seem to comprehend the art and mystery of destroying the human fabric. They seem to know what steps to take to run this magnificent structure into decay and death, but are slow—very slow—to grasp the idea of health and happiness.

The simplest way to raise a child well, *is to desist from abusing it*. Break in at once and forever upon those habits and fashions which are leading children, almost from lisping infancy, into the maelstrom of extravagance and dissipation. Resist the overpowering pressure of the baser and more vulgar customs of modern life, and yield to the surer and better dictates of nature, (if there is no other help at hand,) and the work is done.

But, to raise a *regular, enduring denture*, is not always the work of unaided nature. A careful harmonizing of the conditions of growth with the principles of science and art, is the prerogative of our profession, and which should be exercised whenever there seems to be an inability in nature to perform its task.

In the finest and best developed forms the teeth often present themselves in most unsightly irregularities. In such cases the skill of the dentist must be brought into requisition, for, however strong in texture such

teeth may be, their crowded condition will render them liable to disease from external causes.

A few thoughts in regard to the liability of teeth to decay from neglect and abuse, and the influence of acids and alkalies as they come up, either in the secretions of the mouth, in food, or by direct contact, and we are done.

The low vital power of the enamel renders it susceptible to great and lasting injury, where any of the last named reagents come in direct contact with it. It contains so small a per centum of animal matter that those strong poisonous substances destroy the vital principle, and leave the mineral structure a dead, disorganized mass of matter, which breaks away in the process of mastication, or shows signs of disintegration in black, decayed spots, or a discoloration of the enamel altogether. These evidences of decay often present themselves where no such corrosive action can take place; but the whole theory of external injury must rest upon the hypothesis of some such decomposing agent, constituting, either directly or in an indirect manner, the disease of this hardest of all organized bodies.

That a powerful corrosive action can take place by the decomposing of animal matter, or vegetable substances, through the action of the saliva, when such substances are allowed to remain upon or between the teeth, no one will undertake to deny; and that many teeth are destroyed from such filthy neglect is also a fact beyond controversy. But in most cases, even when those elements are present, and where those more active and more deadly reagents, before mentioned, do come in contact, the influence they exert is very much over-estimated.

If the enamel is of a first-class development, and there are none of the internal causes above enumerated present, such neglect or abuse will be very slow in producing an entire destruction of the denture, or even the decay of an occasional tooth. Where is the practitioner of half a dozen years' experience who has not seen beautiful dentures, of that iron texture, without spot or blemish, save a slight abrasion of the crowns, where the possessor can boast of his ability to "*clip in two*" a ten-penny nail? And this, too, with the other boast of never having touched their teeth with a brush. The Irishman and the German often present such developments, but they are rarely seen in the more modern circles of American life.

We, as Americans, are, however, not without beautiful specimens of first-class teeth, which, too, can be, and in the majority of cases are, preserved through care without a spot of caries, until a late period of life, when, by a sloughing of the "*periosteum*," or an absorption of the integuments, they loosen, become painful, and must be removed.

Much, too, has been said and written about "*acids*" and "*alkalies*," as they come up in the food and condiments in use by modern epicures.

Those deductions and conclusions, we think, are strained and largely overestimated. When mixed and baked, and boiled and cured, they come in contact with the teeth as entirely different chemical compounds, and their influence is no longer acid nor alkaline, but so mild in their effects, especially regarding the fact that they are held there so short a time, that very little injury can be caused by them.

Much of the distress, however, occasioned by all the above enumerated agents, can be prevented by a proper system of hygienic treatment. In order properly to meet all the contingencies necessary, and to comply with the suggestions of science, in the work of *raising* and *preserving* a good, enduring and substantial denture, the dental practitioner should have control of the process of dentition from infancy, and much of the manner of the child's living. The eruption of those organs should be an operation of special care, and when they are fairly developed, frequent inspection and good sanitary directions, with all the treatment, such as the nature of the case may require, and you meet, in a scientific way, all the mandates of what we understand by *dental hygiene.*

LANCASTER, PA.

MERCURY IN VULCANIZED RUBBER.

BY JAMES TRUMAN, D. D. S.

This subject has recently attracted more or less attention in the different associations and journals, but the remarks made have usually been founded more on supposition than upon any real practical knowledge of the chemical changes produced in vulcanizing. This work has not, that I am aware of, been attempted in a thorough manner, nor is it my purpose in this brief article to do more than give some general results of imperfect examinations made. It would seem, however, a work of supererogation to attempt to prove, that which no one should deny, that mercury exists in the coloring matter of the rubber. Sulphide of mercury, (vermilion,) it is well known, can be resolved into its original elements by heat. If it be placed between two glass slides for convenience of examination, and, by means of an alcohol lamp, a gentle heat applied, free mercury will be present in quantities sufficient for examination under a low power of the microscope. But it will require a high degree of heat before the entire amount is resolved.

This well-understood fact led to repeated examinations of various preparations of rubber vulcanized at different periods of time. I propose simply to give the result of these at present, without entering into a tabular statement. Rubber that had been kept in the vulcanizer for upward of four hours, at the usual temperature, exhibited free mercury in profusion, but minutely subdivided. That examined, kept at 320° for

one hour, exhibited minute globules in moderate quantity; while in another specimen, kept for forty minutes at 300°, none could be found. Fresh rubber, exposed to a gentle heat on a glass slide, yielded large globules of free mercury. Although these were large enough to determine the true character by sight, they were further tested by nitric acid. Examinations were made to test the character of the discoloration almost universally present in the piece when first removed from the vulcanizer. The result was, that it consisted of free mercury, from the most minute brilliant point to globules of large size. This also was tested with nitric acid, with the usual results. The action was very rapid, visible to the unassisted eye, by the immediate cleaning of the rubber. Throughout all the rubber examined, a large amount of salts were present. Much of this presented the peculiar appearance of some of the salts of mercury; but it will require a more exact investigation than has yet been given to determine their character.

I think the conclusion may be justified, from the results obtained, that free mercury is produced in quantities proportionate to the amount of heat and the length of time it is kept under the process. That other chemical changes may be produced by the presence of sulphuretted hydrogen, strong evidence exists; but, as yet, I have not had time to prove the supposition to be true.

Occasional globules of mercury of large size will frequently be found upon the surface of plates. The finding of them led Dr. Wildman to make some examinations, the results of which he gave at a meeting of the Pennsylvania Association of Dental Surgeons. I am not, however, prepared to believe that this is a usual exhibition. I have failed, in almost every instance, to verify this fact. This, however, is not surprising, as results in the many examinations made were by no means equal.

As this subject has been delegated to the proper committees of the Pennsylvania Dental Association for thorough examination, I am in hopes that much that is as yet speculation may be placed on a scientific foundation.

The assertion that the amount of free mercury in the rubber is proving deleterious to the health of thousands, will require, I think, a far larger amount of statistical information than we possess at present. The absolute truth, I imagine, will always be difficult to arrive at, owing to a want of knowledge on the part of the dentist of constitutional condition existing in the patient, that may have produced the effects charged to the credit of the rubber. Again, the knowledge requisite to make a critical examination is possessed by the few, and it is not surprising that the remarks often made exhibit conclusions founded on very slender premises. I have not met with any of the mischievous results said to follow the use of this

material; but, at the same time, am not disposed to deny that such have resulted. The statements have been too many and too well supported to take any such extreme position. With me it is yet an open question, requiring fuller and more exact knowledge, before either side can be adopted. So far it must, however, be admitted that peculiar idiosyncrasies of constitution exist, that will be affected seriously by the most minute quantity of any of the active poisons. Admitting this, the question may be properly considered, can the free mercury contained in the rubber pass from that to the oral secretions? It seems to me that this can alone be accomplished from the surface of the rubber plate.

I am not prepared to admit the porosity of rubber, as that is generally understood. In repeated examinations made to test this, by high powers of the microscope, nothing resembling pores has ever presented. It has been found impossible to procure a section thin enough to transmit light, although ground down to extreme tenuity. Examined as an opaque object, it presents a homogeneous mass, with no appearance of any openings for the admission of fluid; nor have I ever been able to discover moisture in specimens that have long been worn. That it is impenetrable to moisture in the ordinary process of wear, is apparent in the non-increase of weight. Time has not permitted to accurately test this, but common experience justifies the conclusion. That it may be penetrated by fluids, under pressure, cannot as yet be affirmed or denied, as the experiment has not yet been tried;* but I do not believe that in the ordinary process of wear in the mouth, fluids ever enter it. Cracks there may be, and these are readily seen, into which fluids pass, and become very offensive. A similar result is sure to follow by the secretions penetrating between the rubber and the teeth; but that it enters the substance of the rubber requires more proof than is now possessed.

Admitting this to be a fact, can we suppose that the minutely divided globules of mercury could pass from the centre, or from any point removed from the surface, to the oral cavity. My own judgment is, that such would be impossible. This view is partially sustained by the fact that the mercury in old worn plates presents the appearance of having remained in an entirely undisturbed condition from the commencement. If, as is supposed, the mercury is being constantly eliminated, there must be a constant chemical change going on to resolve the coloring matter into free globules. This, we presume, will hardly be admitted by any one.

It is, however, time that we had left the speculative on this question, that we may be able to give an intelligent answer to the oft-repeated

* Since writing this, I have examined a very ingenious instrument for testing this, made by Dr. T. L. Buckingham. It is to be attached to the air-pump, and promises to answer the end desired.

inquiries of patients. If, as is asserted by some, thousands are being poisoned by the use of this material, certainly a due regard for their interests, and our own accountability, require a reason for the faith that guarantees such statements.

QUACKERY.

BY T. L. BUCKINGHAM, D. D. S.

Quackery is defined to be the boastful pretensions or mean practices of an ignoramus. But I intend to extend the meaning, and show that what we term quackery is not confined to the ignorant pretender alone, but we frequently find it practiced by those who do, or should know better; and it is by the practice of this better class of dentists that these quacks (or what the printers would call rats) get into the profession. In order to present the subject as I wish to, it will be necessary to call the reader's attention to the advancement and condition of the two branches of the profession, viz: the operative and the mechanical branches. We take it for granted that it is admitted by all, that the practice is divided into these two branches, and that nearly all the talent of the profession has been devoted to the operative branch.

We will not stop now to inquire the cause. The fact is so well known that scarcely any one will deny it; and I think it will be admitted with equal unanimity, that no mechanical operation has ever been described, discussed and explained as fully as the operation of filling teeth. For the last thirty years it has been the favorite subject at all the conventions, and in our books and journals it has occupied more space than any other subject. Every imaginable shape and form of instrument has been minutely described. The process of manufacturing, and the method of using them has been gone over so carefully that there can be scarcely anything new said about them. And then the cavities of decay, the methods of getting at them, the shape they should be made to retain a filling, the fissures, the grooves, the retaining points, have all claimed attention. The means of keeping the cavities dry, with napkins, wedges, ligatures, spunk, rubber dams, and other dams that do no good, have been as fully described. And, to undertake to explain the various processes of preparing the gold and packing it in the cavity, and finishing up the operation, would take a volume. If any one not acquainted with the art of dentistry should attempt to look over the published reports of our conventions and societies, he would think the talent of the whole profession had been concentrated upon the process of filling teeth. Now, what has been the result? The operation of filling teeth has been brought as near to perfection as a mechanical operation can be. The gold is made as solid as it would be had it been melted and poured into the cavity. Whole crowns

are built up on roots and used for masticating the hardest food, and in some cases the wearer shows almost as much gold as there is enamel left on the natural tooth.

While the operative branch has advanced so rapidly, and has been brought so near perfection, what has been done to improve the mechanical branch? I think it will be admitted that it has not only not advanced, but it has retrograded. Twenty years ago most of the dentists who inserted artificial teeth manufactured them. The furnace in the laboratory was an indispensable appliance, and few thought of having a full set of teeth made without having the teeth carved for the case. To be sure, then teeth did not always present as smooth and regular an appearance as those manufactured now, but in the mouth they usually had a much more natural appearance: and, had the attention been paid to manufacturing them that has been given to the operative branch, we might have had them much nearer perfection than artificial teeth are at present. The introduction of rubber as a base has retarded the advancement of this branch perhaps as much, or more, than anything else. Formerly, when teeth were mounted on gold or silver, it required considerable skill and practice to work these metals; and to select teeth, grind and arrange them on the plates, and then solder them and finish them up, even in the rough manner it was sometimes done, required much more skill than it now does to mount teeth on rubber.

Another cause which has held this branch in check, and which cannot be removed is, it does not require the patient to be present while the work is going on; and we are well satisfied that if the natural tooth could be removed from the mouth and taken to the laboratory to be filled, as the artificial ones are to be repaired, the operator would not twist himself up in a cork-screw shape and sweat for an hour or more to perform the operation, but would employ some assistant to do most of the rough work; but, the patient being present, the operator cannot shift it into other hands and still get the credit of doing it, as he can do with artificial work.

But the great cause that has held mechanical dentistry back, is to be attributed to the better class of dentists; those who devote their time mostly to the operative branch. If they would give up the mechanical work entirely, and let those who are willing to attend to it have the benefit of it, there might be some possibility of raising it; but this they will not do. They continue to take impressions, and do the work that requires the presence of the patients, and then let the balance be done by an assistant; and, in a majority of cases, this assistant is either a student just commencing, or some young dentist who does this work to keep from

starving, hoping at some future time to be able to get into regular practice himself, and this work assists him to prolong his professional existence until that time arrives.

If those who persist in inserting teeth would give their personal attention to the cases, and see that the impressions were correct, and the teeth made or selected to suit the case, we would soon have this branch advancing; but they merely take the impression, and, in a majority of cases, it is very badly taken; for it is a fact, that what people do not like to do they never do well. They then select something near the color they want the teeth to be, and this is all the mechanical workman has to go by in mounting the teeth. He has no more interest in it than to get the small pittance that is usually paid him for his work; for, it is true, that while operators are anxious to get all they can for their operations, and think they are never paid well enough, these very men, when they have to employ others, pay them the smallest pittance; at least such has been my experience, and I had a great deal of it some years ago. But the principal cause retarding the advancement of this branch is the low price that these good dentists charge for the work; while they will charge from five to twenty dollars for filling a simple cavity, they will insert a whole upper set for the same amount; and when a dentist who has some skill in this branch attempts to raise the prices so as to compensate himself for his labor, he is met every day with the reply from the patient: "Dr. ——, who you all acknowledge to be one of the best dentists in the city, will make me a set for about half you want to charge; I will go to him." It avails but little to say to them, the doctor whom you have just mentioned does not do his own work, nor does he employ the best workmen. He has the reputation of being a good dentist, and that satisfies the patients.

It is through the mechanical branch the quacks get into the profession. Very few young dentists, let them be ever so well qualified, can establish a practice in the operative department without waiting for a long time, while quacks, who stay a week or two with some one who professes to be a dentist, and will show them how to do a piece of rubber work, will open an office, advertise, and show specimens of their work, and in a little time get quite a run of customers.

We may enact as many laws as we can write out. If we leave this branch of our profession as it is, we will have quacks, and a great number of them. Elevate this branch, so that it will be as difficult to practice it as it is to practice the operative, and the quacks will disappear.

OS ARTIFICIAL AS A CAPPING.

BY FRANK B. DARBY, D. D. S.

I have noticed several articles in the DENTAL TIMES, during the past year, on this subject, some speaking of it highly, while others seem to consider its use destructive to the dental pulp. I think a great many in the profession are prejudiced against it, as I was at one time, and I am willing to acknowledge that my prejudice was without foundation, for I had never tried it. Still, I was so opposed to its use that for a long time I even refused to try it. At last the truth was forced upon me, and my prejudice gradually vanished. This occurred in the fall of 1866, when I had an occasion to remove a large amalgam filling, which one of my neighbors had introduced two years previous, and used this material as a capping. The lady informed me that she went to the dentist at the time this tooth was filled with the intention of having it removed, having suffered with it several days, but upon being assured it could be saved she allowed the operation to be performed. This filling, as I said before, had been in her mouth two years, when the tooth broke away, letting part of the filling escape. She then came to me to have it refilled. I found the tooth in a good healthy condition, and in excavating I cut through the capping before I was aware anything of the kind had been used, and was surprised to see blood issuing from the pulp. I then made inquiry and learned, as I stated above, the previous condition of the tooth. I then refilled it as it was before, using os artificial for the first time, but with a faint idea of success, I assure you. It proved successful, however, and after a time I found myself using it often: and, in fact, from that time I have used it almost daily in my practice with success, although I dared not advocate it, and above all things dared not write an article for publication until I had thoroughly tested its merits, knowing very well that my views were right the reverse of those held by many at that time.

I have spoken of os artificial, or oxychloride of zinc, as a capping; but, strictly speaking, I do not use it as such; I modify its use somewhat by first introducing asbestos.

My *modus operandi* is as follows: After preparing the cavity, I apply chloroform to the exposed point until the pain ceases; then introduce a particle of asbestos, slightly moistened in creasote, (this I consider one of the best non-conductors,) sufficiently large to cover the exposed point; then place upon this os artificial, moistened merely enough to hold together, and after packing allow it to harden before exposing it to the moisture of the mouth. When gold is to be used in filling I generally use enough of the paste to entirely fill the cavity, then dismiss the patients for a few days. Upon their return, remove about three-fourths or two-thirds, as the size of the cavity indicates, of the temporary filling, and fill

upon the remainder with gold, as usual. But when amalgam is to be used, I merely wait long enough to allow the os artificial to set, which is from one to two minutes.

It is very often the case that the patient will not return to have the permanent gold filling put in for three or four months, but in such cases I generally find the temporary filling in good condition and preserving the tooth; in fact, I think I would always prefer leaving the temporary filling in at least three months if I were sure it would preserve the tooth in all cases. My experience with this mode of treating exposed nerves, now for over two years, has been more successful than I imagined at first it could be, and I have no hesitancy in stating that, out of every ten healthy teeth filled in this manner, for comparatively healthy persons, nine of them have proved successful, and the operation attended with but little or no pain, or at least no more than would follow an application to destroy the nerve.

My faith has become so strong that I now cap in this way in almost every instance, rarely ever making use of nerve paste. I have several patients in the village whom I have treated teeth for in this manner, and have an opportunity to see them often, therefore *I know* some of my operations have been successful.

I might mention, too, that I consider os artificial one of the best remedies for sensitive dentine. I saturate cotton in a thin mixture of it, and place it in the tooth, and let it remain two or three days; the cotton becomes hard, and serves as a temporary filling.

I do not advance this mode of treatment in capping exposed nerves, with the addition of asbestos, as original with myself; many are undoubtedly using the same. I give the result of my experience to the profession for what it is worth, and think if it is given a fair trial, putting aside all prejudice, it will prove quite as successful with others as with myself.

OWEGO, N. Y.

LOST PARTS RESTORED BY AN ARTIFICIAL APPLIANCE.

BY B. A. RODRIGUES, M. D.

The daily exercises of a responsible professional business have furnished me numerous opportunities for communicating pathological facts, and surgical performances of interest to dental science; and, sometimes I think my delinquencies, in this connection, almost reprehensible; for since the record of a case of "*exostosis of the antrum,*" which I published in the Philadelphia *Medical Journal*, some years since, copied subsequently in Harris' Dental Surgery, I have scarcely contributed anything to dental literature.

I desire, at present, to invite attention to the case of a gentleman, aged 30 years: who, after protracted, ulcerative and absorptive inflammation of the palate had terminated, came under my care; the disease having compromitted in its ravages both horizontal plates of the palate bones, and the palatine processes of the superior maxillary, leaving an osseous ridge of inconsiderable size, circumscribing concentrically the alveolar border of the upper jaw.

It is needless to remark that *deglutition* and vocalization were almost completely destroyed, so that while fluids and solids regurgitated, the voice resounded through the upper part of the head and nostrils, and even inspiration was impaired when the mouth was closed, by collapse of the *alæ nasi*.

The state of our patient plunged him into hopeless despondency, and excluded him from all social intercourse.

A range of very fine teeth induced me to seek a basis of support for some mechanical adjustment, other than the usual clasps around the teeth, and availing myself of the semicircular bony ridge, the only vestige of the former osseous palate, I contrived a vulcanite plate, with a crescentic *sulcus* or *groove*, which we so carefully adjusted and finished, as to secure successfully a *basal* support for the entire piece. So completely has the chasm been filled by my "*operculate plate*," as I have termed it, that all deficiencies and defects have been signally removed.

Shut out of society by the loss of voice, his dejection of spirits was at once relieved, as he stated to me with undisguised gratitude; that while in company with some ladies, they exclaimed with surprise that his voice was restored.

These particulars I have entered upon, presuming, that you may deem them of sufficient importance, to publish in your journal.

CHARLESTON, S. C.

A STATISTICAL NOTICE OF THE CLINICS IN THE PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

BY E. WILDMAN, M. D., D. D. S.

In presenting to the readers of the DENTAL TIMES a tabular history of the operations performed in the clinics of this institution, from its organization to the present date, it would appear almost needless to add a word to call the attention of any one to the valuable information they convey to the dental student. But, as there are still many dentists who adhere to the idea that a student can become as fully accomplished in all the requirements necessary to fit him for the profession, under the instruction of a

private preceptor, as in a dental college, we solicit such, and dental students, to give these tables a careful perusal.

They show that the average, for each session, has been over 21 patients for every matriculant; that the average for operations has been 23 fillings inserted, 42 extractions, and total operations performed, by each, 70.

To obtain a more correct view of the present working of the college, we will give the average for the last three years. In making this estimate, 29 matriculants who graduated on time, under the provisions of the second article, on "qualifications for candidates," are not taken into the calculation, as they performed but few operations in the clinics.

During this period the average, each session, has been, for every student, 34 patients, 31 fillings inserted, 41 extractions; total operations, 83. And in the laboratory the average has been 26 teeth mounted and inserted for patients, by each student, per session; and including those mounted on depositing cases, by candidates for graduation, make it 31.

Under the heading of "other operations," and summed up under "total number of operations," is included diseased antrum, alveolar abscess, periostitis, inflammation of the gums, and various other diseases to which the buccal cavity is incident, and which comes under the province of the dental surgeon to treat.

Among the class of patients who present themselves at the clinics of a dental college, are found diseases which rarely occur in private practice.

The advantage to the dental student in the clinic is not confined alone to the large number of patients assigned especially to each one, but he has the privilege of witnessing all the operations therein performed, now averaging, per session, from 5,612 to 7,532, all of which are performed under the watchful guidance and supervision of able and skillful demonstrators.

Now, this presents a mass of work and advantages which no private preceptor could offer to his pupil, however extensive his practice might be. This great amount of work performed by the student is only a part of the advantages secured to him: it is but the practical application of the teachings of the various chairs in the college.

I think, after a careful investigation of the above data, the most prejudiced will admit that a student, who has had the required preliminary education under a private preceptor, and then enjoys the privileges of a course of instruction in a dental college, will have a better ground-work to enable him to take a high position in the dental profession, than one who may confine himself alone to private instruction, no matter what skill and attainments his preceptor may possess.

OPERATIVE DEPARTMENT.

Session.	No. of Patients operated for.	Gold Fillings Inserted	Tin.	Amalgam.	Wood's Metal.	Hill's stopping	Ox. Chl. Zinc.	Sub. not given.	Total Fill'g	Extraction of Roots & Teeth.	Irregularities.	Pivot Teeth set.	Other Operations.	Total number of Operations.
1856–'7	*296	367	228	3					598	862		10	115	1,685
1857–'8	368	545	287	2					834	2,223	2	9	84	3,152
1858–'9	394	568	335	5					908	3,074	16	18	156	4,172
1859–'60	308	612	310	6					928	2,858	20	25	224	4,055
1860–'1	567	720	360	2				14	1,096	3,129	41	8	327	4,601
1861–'2	620	454	325	7				11	797	2,464	51	13	272	3,597
1862–'3	772	559	526	3				12	1,100	2,067	10	5	204	3,386
1863–'4	1,687	607	690	6				13	1,316	2,112	15		385	3,828
1864–'5	1,487	627	696	12	9	14			1,358	2,010	10	2	297	3,677
1865–'6	1,692	671	562	18	25	28			1,304	2,107	20	2	326	3,759
1866–'7	2,517	1,216	1,026	26	12	96			2,376	2,451	61	17	984	5,889
1867–'8	2,759	1,393	1,091	20	28	105			2,637	3,986	57	15	837	7,532
1868–'9	2,663	1,124	701	85	4	108	62		2,084	2,990			538	5,612
	16,130	9,463	7,137	195	78	351	62	50	17,336	32,333	303	124	4,749	54,845

* No record kept of patients for whom extraction alone was performed prior to 1863–'4.

MECHANICAL DEPARTMENT. MATRICULANTS AND GRADUATES.

Session.	No. of patients	Teeth Mounted for patients.	Obturators.	Teeth on Depositing Cases.	Total Nos. of Teeth Mounted	Matriculants	Degrees conferred on Students.	Honorary Degree.	On Time and Examination.	Total Degrees.
1856–'7	†	474		‡	‡	33	13		§	13
1857–'8		679				48	15	1		16
1858–'9		1,141	4			48	25			25
1859–'60		1,579				51	21			21
1860–'1		2,037				63	36			36
1861–'2		1,210				44	19			19
1862–'3	95	1,213	1			41	20	2		22
1863–'4	125	1,647	3			44	17			17
1864–'5	154	2,009	2			56	29	5		34
1865–'6	154	2,735	1			69	33		3	36
1866–'7	167	2,660	2	431	3,091	100	26		23	49
1867–'8	157	2,040		438	2,478	78	31		2	33
1868–'9	95	1,278	2	364	1,642	80	24		4	28
	947	20,702	15			755	309	8	32	349

† No record kept prior to Session 1862–'3. ‡ No record of Number kept until Session 1866–'7. § Having complied with 2d Article on "Qualifications for Graduates."

DENTAL PLEDGES.

BY C. A. MARVIN, D. D. S.

Perhaps there is no one feature which more strikingly distinguishes a profession from a trade than this matter of pledges.

The architect pledges himself to furnish a symmetrical and convenient plan of your house. The builder pledges a faithful execution of that plan, and consents to suffer a loss if his pledge is not redeemed. All mechanics pledge beforehand that the articles they are to furnish shall be perfect and satisfactory; that the work they are to do shall equal the best, and endure with the most durable.

This is a characteristic of tradesmen and manufacturers. Not so with professions. A professional man does not make pledges as to results. He cannot do it. He ought not to do it. It is not in harmony with his calling.

What physician can pledge a cure in a certain number of days? or can pledge a cure at all? What lawyer can pledge a successful issue to a cause just commenced? It smacks of the charlatan to attempt it.

Neither should a dentist give pledges. I mean, of course, special pledges of specific results.

No dentist, when he has filled a tooth, can say with certainty how long that tooth will last. A thousand contingencies may arise, unsuspected by him, any one of which will affect, to a greater or less extent, the permanence of the organ.

As a physician, when he has cured his patient, cannot tell how soon he may have a return of the same disease, so cannot a dentist say positively, when he has treated and cured a diseased tooth, or bone, or gum, how long a time may elapse before his services may again be required to relieve pain in the same part.

It is not a favorable sign when a dentist is heard promising his patient that such and such operations will last so many years; that there never will be any more pain in a certain part, &c. The inference from such promises is, that the dentist does not appreciate his profession, or is not a true man. If he rightly understands the intricacy of the work daily committed to his hands, he will make no such random promises. Think of it a moment.

A dentist is dealing constantly with parts of the living organism. Each tooth he touches is as truly and delicately connected with the whole structure as is the eye. There is vitality within it and around it. There is nerve life, blood life and flesh life within and about every tooth. Neither has a tooth an independent existence; it is intimately connected with parts contiguous and parts remote. A diseased tooth makes "the whole head sick and the whole heart faint." The diseases to which the

dental organs are subject, and to the production of which their defective condition tends, cannot be enumerated; their name is legion.

Is it a slight matter, then, to take the charge of teeth, and be responsible for their healthy development and condition? Oh, no, it is no slight matter. A grave responsibility rests upon the man who announces himself as a dentist. And every year that rolls over our heads is educating the public to hold dentists to their responsibility more and more.

When the opinion of a dentist is asked to-day he is expected to give it with more readiness, and to give a more intelligent opinion, than was looked for a half score of years ago.

An intelligent opinion on any subject can only be given when that subject is thoroughly understood; hence the necessity of study, of knowledge. And by just the degree of knowledge a dentist has, by just so much will he appreciate the true nature of the work before him, and in proportion as he appreciates this will he be cautious in pronouncing opinions, earnest in giving advice, faithful in rendering service, and firm in refusing pledges.

But some one will say: "What am I to do when I am asked if I warrant my work? If I say I do not, I am immediately told that Dr. Smooth Tongue and many others do, and that if I cannot do the same, I must lose the case."

I answer, the matter is very simple. It can all be arranged to the satisfaction of both patient and dentist. The answer to a demand for a pledge should be this: "The pledge I give you is, that you shall have my faithful service." More than this no one can give, let him make all the pledges he will. Less than this, no dentist should ever render to his patient. And when a dentist has expended his best efforts upon any case, he has done his duty, no matter what the result may be. It is all that can be asked of him. If his skill be not sufficient to produce a favorable result, no previous promise of such a result would be of any avail. The only effect of such a result would be to place himself in an unfavorable attitude before his patient, and cause all his labor to be unappreciated. If, on the other hand, his skill is equal to the wants of the case, no pledge is necessary to induce him to apply it.

Success is not always attained. It is claiming too much to say I have never lost a case. Every dentist loses cases; that is, every dentist meets cases where the same degree of success cannot be attained; where he cannot achieve what he would; where he has grave doubts as to any lengthened usefulness of the organ upon which he has been working. How extremely unwise, then, to make promises or predictions as to the precise result he will effect.

Let it be distinctly understood, that I appreciate the difference between

an opinion and a promise; although so different, many people take them as synonymous.

Opinions are proper if wisely given; for, in many cases, they aid in coming to a determination. A dentist is supposed to be able to form an opinion of cases as they come under his observation, and it is a matter of daily occurrence that the decision of parents, as respects operations upon their children's teeth, or upon their own, is dependent upon the expressed opinion of their dentist. But such an opinion should be given guardedly, and on grounds which, if explained, would commend themselves to the understanding of the intelligent patient.

Advice should be positive; opinions cautious and well governed; pledges refused.

The reputation of a dentist furnishes the best and only sure pledge that can be given; on this the public must rely. If he be known as skillful and faithful, no other guarantee is required, and none other should be offered. Dignity of character and self-respect demand this.

As a physician is employed in order to profit by the skill he possesses, and the case is entrusted to his hands that he may exercise that skill upon it, so must it be with the dentist. Cases are committed to him for treatment, and he handles them as wisely as he may, producing the best results in his power. This is all he can do. This is all he should agree to do. The question will settle down at last upon this basis. Let every dentist, then, take the position at once, thus dignifying his profession, commanding respect, and dealing honestly with himself and the public.

BROOKLYN, N. Y.

IMPORTANCE OF CLEANSING THE TEETH EVERY DAY.

BY J. S. SMITH, D. D. S.

The importance of keeping the teeth in a cleanly condition cannot be brought before the minds of our patients too frequently, especially the young. As practitioners of a liberal profession, and as moulders of the public mind in regard to a scientific calling, we should begin at home, and bring every facility into requisition to promote a deep and abiding interest in the minds of those entrusted to our care, in regard to keeping the teeth (and dental apparatus generally) in a cleanly and healthy condition. By laying down hygienic rules before them, they are led to view this important matter in its true light, and will thank us for the interest we manifest in their welfare. We shall never lose by imparting what we know, if it be but little, if that little be only truth. It may not be a direct gain in form of dollars and cents, but indirectly it will pay us for our trouble. The entire profession at large will be benefited by diffusing

intelligence among the masses concerning the paramount importance of patronizing the dentist.

I have had persons to call upon me to relieve pain, caused by the accumulation of calcareous deposits upon their inferior teeth, while, at the same time, they were wearing an entire upper denture. The amount and density of the tartar convinced me the work was inserted after the accumulation had progressed to a considerable extent. A gentle hint to the wise should be sufficient.

When patients place themselves under the care of the dentist, for the insertion of substitutes, where there are natural teeth in the mouth, we should not only keep these in view, but endeavor to instruct them in regard to preserving those that may have escaped the ravages of disease.

Calcareous substance has no injurious influence upon the enamel of the teeth, (I believe all observers and writers agree upon this point,) but is very injurious to the parts in connection with them, upon which they depend for support. If permitted to collect upon the teeth, so as to encroach upon the gums and alveoli, it will hasten the absorption of this tissue; and, if not removed in time, those teeth will eventually loosen and cause much irritation to the surrounding parts, if they do not drop out. Surgical aid must be resorted to for the completion of the work disease commenced. However, there are exceptions. In some constitutions, this progress goes on with but little annoyance to the patient; while in others, inflammation and suppuration of the adjacent parts will follow, breaking up the attachment of the teeth, and eventually causing them to fall out for want of sufficient support.

As for the varieties of tastes, and the elements of which do not come strictly under the head of this paper for discussion, I will aim principally at exciting a deeper interest in keeping those organs that were given to form part of the anatomical structure of man for a wise and beneficent purpose in a normal state, so far as cleanliness is concerned.

Not more than one-third of all the patients visiting the dentist are aware of the risk run from deposits of tartar, to say nothing of other foreign substances, that are allowed to collect around the teeth. Frequently they will come complaining that they have been attacked with scurvy upon the gums. On examining the case, we find no scurvy, but a huge lump of salivary calculus closely hugging part of the body of the crown, and running down in some cases nearly to the apex of the fang.

The disease first mentioned rarely attacks persons residing in rural towns and districts, or even large cities. It is more prevalent among those who are confined to shipboard; those who subsist upon one kind of food, and use stagnant water, and are compelled to live exposed to a moist, cold, foul atmosphere. That all persons are not equally affected

with calculus upon their teeth is a fact long known. The lymphatic temperament is said to be the most subject to the deposition of tartar. In my observation, I have always found it to exist in mouths of patients where the saliva flows in great quantities. The saliva has an alkaline character, thus holding in solution the phosphate of lime; and if the mucus be in an acid state, the action of the acid mucus upon the saliva will cause the phosphate to be precipitated. When we have this state, the acid mucus should be neutralized by an alkali. Scrupulous care should be taken in removing all depositions that may be connected with the teeth. The application of the brush and burnisher should follow this, and should never be neglected. The surface must be made smooth, otherwise the sharp particles remaining after the use of the excavators would afford lodgment to another coating in a short time. To prevent as much as possible a second attack, the saliva and blood should be kept in a normal state by using the proper remedies, and avoiding an excess of such kinds of food that tend to promote this deposition.

The patient should be instructed to clean the teeth daily with a well-selected tooth brush. A soft tooth brush is said to be the safest, as it is not so liable to wound the gums. A finely pulverized tooth powder should be used in connection with the brush. Care should be taken in recommending powders. None should be used, or prescribed to be used, the ingredients of which are not soluble in water, such as gum myrrh, charcoal, pumice stone, tobacco ashes, &c. Gum myrrh will deposit gum upon the teeth, while charcoal and pumice will settle under the margins of the gums, irritating and promoting absorption. The following formula makes a very safe and reliable tooth powder, called Barker's formula:

℞.—Os sepia, lb. v.;
Precip. chalk, lb. v.;
Pulv. orris root, lb. iiss.,
Sugar, white, q. v. lb. j.;
Carmine, No. 4. ℥j.;
Oil rose, gtts. x.—*Mix.*

The brush loaded with powder should not only be rubbed around the labial and buccal parts of the teeth, (which is too frequently the case,) but should be carried over the crowns and lingual and palatal surface. After all this careful brushing, the interstices between them are very imperfectly cleaned, if cleansed at all. It is seldom the brushes will pass between the teeth, and this is the very place they need it most. I know of no other method than to employ the quill and floss silk, or common packing thread. These are good appliances for cleansing. A good tooth wash should be placed in the hands of all to be used in connection with the dentifrice. Thus, by inculcating cleanly habits with all who may come

under our care for treatment, we will not have the mortification of seeing fillings, that have been placed in the teeth with skill, coming under care again, covered with mucus, gums in a turgid condition, the interstices between the teeth filled with remnants of food in all stages of decay. It is in keeping the teeth clean, as it is with all other important duties devolving upon us, some individuals need more prompting and definite instruction than others. Some have a natural pride in keeping their teeth clean, others have not.

I think if every dentist would instruct all who need instructions in this important duty of cleansing the teeth, showing them that it is not only injurious to their health and preservation, but for the health generally, in due time communities would become revolutionized in this important matter, and not only they but the profession of dentistry would be benefited by it. Remember, an "ounce of prevention is worth a pound of cure."

COLUMBIA, PA.

Dental Associations.

PENNSYLVANIA STATE DENTAL SOCIETY.

[Reported by Dr. R. Huey, D. D. S.]

Pursuant to adjournment, the State Dental Society met in the Hall of Representatives, Harrisburg, at 10, A. M., on Tuesday, June 8th, Dr. Samuel Welchens, 2d Vice-President, in the chair.

Dr. H. Gerhart, in the absence of the Chairman of the Board of Censors, examined and reported favorably on the credentials of the following delegates:

Harris Dental Association.

Drs. John McCalla, Samuel Welchens, Wm. N. Amer, M. H. Webb, John G. Moore, Lancaster; Dr. P. W. Hiestand, Millersville; Dr. J. Z. Hoffer, Columbia.

Lebanon Valley Dental Association.

Dr. W. H. Scholl, Bernville; Dr. W. K. Brenizer, Reading; Dr. W. K. Lineaweaver, Pottsville.

Cumberland Valley Dental Association.

Dr. Geo. W. Neidich, Carlisle; Dr. Geo. F. Platt, Chambersburg; Dr. James Fleming, Harrisburg.

Lake Erie Dental Association.

Dr. A. B. Robbins, Meadville; Dr. J. G. Templeton, New Castle; Dr. Geo. B. McDonald, Conneautsville.

Susquehanna Dental Association.

Dr. H. Gerhart, Lewisburg; Dr. H. H. Martin, Jersey Shore.

Pennsylvania Association of Dental Surgeons.

Drs. John H. Githens, Amos Wert, Philadelphia.

Pennsylvania College of Dental Surgery.

Dr. T. L. Buckingham, Philadelphia.

Odontographic Society of Pennsylvania.

Dr. J. W. Moffitt, Harrisburg.

Dr. R. Huey, Pennsylvania Association of Dental Surgeons, and Drs. Eisenbrey and , of the Odontographic Society, were tendered complimentary seats. The societies which they represented not having fulfilled the requirements of the constitution, they could not be admitted as delegates.

Adjourned, to meet at 2, P. M.

AFTERNOON SESSION.

The meeting was called to order by the President, Dr. A. B. Robbins.

Reports of committees being in order, the Executive Committee reported that they obtained the Hall of Representatives for this meeting, that they succeeded in securing an act of incorporation for this body, but failed in the "Law to regulate the practice of dentistry."

The Charter was then formally accepted by the Society.

The Committee on Publication reported the printing of two hundred and fifty (250) copies of the Constitution, &c.

The Treasurer's report was referred to the Executive Committee.

The Annual Address of the President was listened to with marked attention. It contained some sound advice relative to the workings and interests of the Society, which was afterwards acted upon.

The Secretary read a letter from Dr. Ambler, a delegate from the New York State Dental Society, expressing the interest felt in this Society, by the body he was chosen to represent, and regretting his inability to be present.

Dr. Samuel Welchens read an Essay on Dental Hygiene, which was referred to the Committee on Publication.

The Society then proceeded to elect officers for the ensuing year, with the following result:

President.—Prof. T. L. Buckingham.

1*st Vice-President.*—Dr. Geo. B. McDonald.

2*d Vice-President.*—Dr. James Fleming.

Recording Secretary.—Dr. Geo. W. Neidich.

Assistant Recording Secretary.—Dr. Wm. N. Amer.

Corresponding Secretary.—Dr. Samuel Welchens.

Treasurer.—Dr. John McCalla.

Censors.—Drs. Robbins, Brenizer, Martin, Gerhart and Amer.

Publication Committee.—Drs. Neidich, Welchens, McCalla, Prof. Truman, Drs. Stellwagen, Moffitt and Suesserott.

Executive Committee.—Drs. Templeton, McDonald, Robbins, Prof. Truman, Dr. Moore.

Delegates to American Dental Association.—Drs. McDonald, Martin, Moffitt, Scholl, Welchens, Fleming, Robbins and Gerhart.

Delegate to Ohio State Dental Society.—Dr. Templeton.

Delegate to New York State Dental Society.—Dr. A. B. Robbins.

The Physicians and Dentists of Harrisburg, were, by resolution, invited to be present, and participate in the meetings.

Prof. Buckingham was invited to deliver a public address at our next meeting, to be held at Pittsburg.

Adjourned, to meet at 9, A. M., to-morrow.

WEDNESDAY, JUNE 9TH.

The Society was called to order at 9 o'clock, and took up the "Bill to regulate the practice of dentistry." A thorough and earnest discussion ensued, in which a strong feeling was manifested to make another effort to have the bill passed. It was committed to Drs. Robbins, Buckingham, McCalla, Martin and Fleming, who were directed to make whatever changes they deemed necessary, and present it to the Legislature.

On motion, the Society recognized and adopted the essential features of the Code of Ethics of the American Dental Association.

The specific and physiological effects of vulcanized rubber were discussed with much interest.

Dr. Welchens had several cases presenting abnormal conditions, but he could not believe that the deleterious effects arose from the use of the rubber plate.

Dr. Buckingham had observed in many specimens of rubber, under the microscope, a metal which he believed to be mercury.

Dr. Moffitt mentioned a case where, in wearing a rubber plate, the mouth became very much inflamed and ulcerated on the surface. He advised a discontinuance of the use of the plate, which was attended with entire success. The patient and himself not being satisfied, the piece was again inserted with the same result. Afterwards a platina plate was inserted and worn with entire satisfaction.

Dr. C. B. McDonald had observed that food was much more liable to remain on the surface of a rubber plate than on one of metal. Where persons are uncleanly in their habits, this irritation is much more liable to occur.

Dr. Moore entertained the opinion that the irritation of the mucous membrane was caused by the foreign particles adhering to it.

Dr. Hoffer being a Homœopathist in belief, regarded the infinitesimal amount of mercury present would certainly have a constitutional effect.

Dr. Amos Wert had a case where the membrane was very much inflamed, but he attributed it to the plate not being vulcanized as hard as it should have been. He had never seen any irritation when the mucous membrane was naturally hard and healthy. He had noticed the same effects from silver plates.

Dr. Buckingham explained, that when the effect was merely a local one he did not place much importance to it. He referred more particularly to constitutional effects, with unmistakable symptoms of ptyalism.

Dr. McDonald considered the non-conducting properties of rubber as a strong argument against its use.

Dr. Robbins had found in several cases unmistakable evidences of mercurial action in the mouth and fauces—a discontinuance of the use of the plate restoring the normal action.

Dr. Robbins presented casts of an interesting case of irregularity, in which the teeth were placed in their proper position in the arch, the contour of the face greatly improved, and an impediment in the speech entirely removed, and explained his process.

Drs. McCalla and Templeton conducted to the chair the President elect, who, in a brief speech, thanked the society for the honor conferred upon him.

On motion, a vote of thanks was extended to the retiring President for the admirable manner in which he had conducted the proceedings of the Society.

Drs. McDonald, Templeton, McCalla and Suesserott were appointed essayists for the next meeting, and requested to inform the Corresponding Secretary of their subjects, that the members might be notified, in order to make preparations to participate in the discussions which, it is hoped, will follow each essay.

Dr. Robbins offered the following:

Amend Article XI, by striking out all after the words "vote of," and insert the words "the members present."

Dr. Geo. W. Neidrich read an essay on "The Histology of the Dental Tissues," which was received with applause, and referred to the Committee on Publication.

Dr. Robbins offered the following amendment to the Constitution:

ARTICLE XII.—CERTIFICATE OF MEMBERSHIP. Any member of the State Dental Society may, upon passing a satisfactory examination by the Censors, receive a certificate of membership, under seal, signed by the Censors, President and Secretary.

Dr. Buckingham was appointed to procure a suitable seal for the Society.

Adjourned, to meet at Pittsburg on the third Tuesday of June, 1870, the session to continue three (3) days.

BUCKS COUNTY DENTAL ASSOCIATION.

REPORTED BY G. W. ADAMS, D. D. S.

A number of dentists of Bucks County and vicinity, met at the office of Dr. J. S. Rhoads, in Doylestown, on the 7th of June, 1869, and, after a free interchange of views and sentiments, it was decided to form a *Dental Society*, under the name of "*The Bucks County Dental Association.*" The officers thereof, for the ensuing year are—President, Dr. H. P. Yerkes; Secretary, G. W. Adams; Treasurer, J. W. Scarborough; Executive Committee, J. S. Rhoads, F. Swartzlander and J. Hayhurst.

This Association meets semi-annually, on the first Monday in May and November—next meeting to be held at the Temperance Hotel in Newtown, Pa. Subject for discussion—"*Taking Impressions.*"

Editorial.

ASSISTANT SURGEON WOODWARD'S LECTURE.

We recently had the pleasure of listening to this gentleman at the Hall of the College of Physicians and Surgeons.

We call it a lecture, but it partook more of the character of an exhibition of what the Government has succeeded in doing, through its aids, in the medical department at Washington. Dr. Woodward has earned well-deserved laurels, the world over, for his efforts. This success was abundantly proved during the course of the lecture, and the results obtained were very satisfactory in photographing, by the aid of high powers of the microscope. The minute anatomy of the various tissues were exhibited with a definiteness of outline and fullness of detail that called forth frequent bursts of applause from his audience.

We were particularly struck with his rendering of Nobert's lines. The nineteenth band of this plate was resolved into clear and well defined lines upon the screen. This feat was accomplished by the use of the sixteenth immersion lens.

Whether this process of illustrating tissues can be made available for

ordinary lecturing purposes, the future will prove. We think the Government owe it to the people that the medical schools should be furnished with duplicates of those photographs at a reasonable rate. At present, we understand, no copies are allowed to be taken. This is a narrow contracted policy, unworthy of a liberal government, and injurious to the educational interests of the country at large.

It is to be regretted that Dr. Woodward felt called upon to attack Dr. Beale's theory of the growth of tissues, in the manner he did. It would have been exceedingly gratifying to have heard his views at length on this subject. It seemed to us that this much was at least due to the reputation of one of the most conscientious and laborious workers in the ranks of science.

Upon the whole, we think this interesting exhibit of some of the results of Governmental aid, abundantly proves the importance of its assistance in matters of this kind. We have every reason to hope for a rapid advancement in microscopical research, by the free and generous use of the almost inexhaustible means at command.

Dr. W. deserves the thanks of the scientific public of Philadelphia for the lecture delivered; as also the Biological and Microscopical section of the Academy of Natural Sciences, through whose influence he was induced to deliver it.

SAMUEL S. WHITE'S PREPARATIONS FOR THE MOUTH.

We had the pleasure, recently, of inspecting the preparations put up by this gentleman, such as tooth powders, mouth washes, cologne, &c., and think we perform a duty to our readers in calling attention to them.

It must be apparent to every observant person that the manufacture of powders, soaps, washes, &c., by irresponsible individuals, has assumed proportions that render some notice of it imperative on the part of those who have the welfare of their fellow-men at heart. In the majority of cases these preparations may be free from injurious substances; but, as their composition is kept a profound secret, nothing can be, nothing ought to be done, but to condemn the whole.

So unblushing has this species of quackery become, that we sadly need a law, if none exists, to put a stop to the wholesale destruction of teeth by the peddlers of these nostrums at the corners of our streets. We all know that the public "cleaning of the teeth" of those unfortunate children who submit to it, means their total destruction. Another class, but one remove from these, claiming the honored title of D. D. S., parade their wares in the daily papers, city cars, &c., utterly regardless of their own or their profession's reputation.

We are, therefore, gratified that a responsible person has entered largely

into the manufacture of preparations, the formulas of which are *not secret*. From a careful inspection of these, we have no hesitation in asserting that they contain nothing in the least injurious to the teeth, or parts adjacent, if used under proper limitations, as all such preparations should be. They are not only valuable for the objects intended, but elegant in character, reflecting credit upon the taste of the manufacturer.

The extensive scale upon which they are prepared enables the proprietor to place them at a price as low, if not lower, than they can be made by individuals. We therefore hope that in future there will be no necessity to recommend patients to try the sozodonts or other irresponsible stuffs so much in general use.

THE STATE DENTAL SOCIETY.

The annual meeting of the above organization took place at Harrisburg on the 8th of June.

The meeting, though not as large as it should have been, was well attended, and full of interest to those present. We present our readers with a full report of the proceedings.

It will be seen that, owing to the neglect of some of the societies to forward their constitutions, some difficulty was experienced in admitting their delegations. This want of regularity is, perhaps, inseparable from all new organizations, and is one easily remedied in the future.

We regret that the Convention did not spend their time in completing a law to be presented to the next legislature. The reference to a committee, we fear, will result in nothing, as committees of large bodies, widely separated, are proverbially slow to act.

The election of our colleague, Dr. T. L. Buckingham, to the presidential chair for the ensuing year, is an honor, we think, eminently earned by long and faithful service in the profession.

THE NEW YORK COLLEGE OF DENTISTRY.

We learn that this institution has ceased to exist, or, at least, is in such a condition that its resurrection is hardly among the possibilities. The causes of this sudden break up have not yet been fully made public, nor is it essential they should be. We regret this failure, as it will have an injurious effect upon any future efforts to enlist the sympathy and co-operation of the profession in Dental Schools. Perhaps no other institution of a similar character has had more of that fostering care, or a greater amount of local interest than this, and it is to the credit of New York dentists that such was the fact.

We have long been of the opinion that the increase in the number of

Dental Schools is far in advance of the wants of the profession. The forcing process which has been adopted, under the mistaken idea that the more schools the more students, must end disastrously to some and injury to all. The increase in the number of these must be in exact ratio to the increase of intelligence and cultivated appreciation of the needs of professional life. That this is a slow process all must admit. Colleges as educators are valuable in proportion to their ability to impart instruction, and this ability is greatly dependent upon the material aid they receive in the shape of dollars and cents. Talent is an excellent thing: indeed, it is indispensable to success here and elsewhere; but when ability finds itself unsupported by pecuniary reward, the supposed honor of position fails to furnish stimulus to exertion, and failure results. Instead, therefore, of being educators in the enlarged sense, the proportions are gradually dwarfed, until they become a by-word of reproach, to be held up as examples of the failure of Dental Schools. Better, then, in our judgment, aid in making those institutions more powerful for good, that have shown their ability to advance amidst many discouragements. Insure their stability, and the graduates will feel that the diploma received is worthy the labor expended to procure—a feeling that can never attach to anything so ephemeral as many must be.

BOSTON DENTAL COLLEGE.

We append the following report of the proceedings of the Supreme Judicial Court in this case:—

SUPREME JUDICIAL COURT—SUFFOLK, SS.—JUNE 19. COLT, J.

The Attorney-General, by Relation, vs. The Boston Dental College, et al.

This was an information, at the relation of John P. Ordway and others, constituting a minority of the Board of Trustees of the Boston Dental College, to restrain the respondents, the majority of the board, from conferring the degree of "Doctor of Dental Surgery" upon certain candidates who have been recommended for such degree by the faculty of the college. By the act of incorporation, passed June 3, 1868, the trustees of the college have authority to confer the degree of "Doctor of Dental Surgery" upon candidates therefor, who, upon satisfactory examination by the faculty, have been recommended to the trustees for the degree, provided the candidates shall have devoted three years to the study of dentistry with a practitioner of dental surgery, who shall be approved by the faculty, or shall have been in the practice of dental surgery for eight years, *including two full courses of lectures*, the last of which to be pursued in the Boston Dental College.

At the hearing on Saturday, on a motion for an injunction, it appeared that the college was opened for the instruction of students in the month of September last, and that it has been in operation about ten months; but that during this time the students have attended lectures in the afternoon and evening, so that, as alleged by a majority of the trustees, they

have attended "two full courses of lectures" within the meaning of the act of incorporation.

It was, however, contended on behalf of the complainants, the minority of the trustees, and evidence was offered to show that, according to the usage of all medical and dental colleges, only one "full course" of lectures can be attended by a student during a single academic year, and that, accordingly, the candidates who have attended lectures but ten months, have not attended "two full courses" of lectures within the meaning of the act; that the conferring of the degrees will defeat the purpose, and be contrary to the desires of the persons who have contributed money for the support and uses of the college, and will not promote the advancement of dental science and art.

After hearing the evidence, the judge ruled that the words of the charter must be construed according to the usage of other medical and dental colleges, and that when so construed, the words "two full courses of lectures" mean courses of lectures extending over two academic years.

The injunction was accordingly granted, and it being the purpose of the parties merely to obtain the opinion of the court upon the true construction of the charter, the injunction was, by consent, made perpetual.

A. A. Ranney for the complainants, and B. E. Perry for defendants.

We have received, and are under many obligations to Dr. E. Q. Naghel, of New Albany, Indiana, for a cast of a mouth under treatment by him, consisting of two rows of teeth in the anterior part of the arch. This extraordinary development is occasioned by four (4) supernumerary teeth, two in the front row between the central incisors, and two in the posterior row, between the laterals. The development of the normal teeth is excessive, being a third larger in every direction. Dr. N. describes the individual as a "hideous" looking object, which certainly must have been the case, as it is one of the rarest specimens of malformation that has fallen to our lot to examine.

We are also under renewed obligations to Dr. F. R. Thomas, of this city, for a very fine specimen of deciduous incisors, united their entire length.

We received some time since one of Craig's microscopes, and have been examining some of the objects that are prepared by the manufacturers, as well as others. The instrument certainly magnifies more than any other similar microscope we have used, having but one lens, and being arranged so as to require no focal adjustment, it can be used by any one; it shows the blood corpuscles, the tubuli in dentine, and the cells in vegetable tissue, and when the price is taken into consideration, it being but $2.75, it is certainly one of the cheapest as well as the most useful nstruments offered to the profession. T. L. B.

Book Notices.

We have received the April number of the "*Deutsche Vierteljahrsschrift*.

It contains the usual amount of interesting matter, some of which we should like to transfer to our pages, but have only room in this number for a synopsis of contents.

The 1st article calls attention to the Central Convention of German Dentists, to be held at Frankfort-on-the-Main, with the different subjects to be brought up for discussion.

2d. Investigation of a Malformed Tooth of the Inferior Maxilla, by Prof Wedl, of Vienna.

3d. Contribution to the Pathology of the Teeth, by Dr. Hohl, of Halle.

4th. The Necessity for the Investigation of Extracted Teeth, by E. Mühlreiter, of Salzburg.

5th. Contribution of Cases of Retarded Dentition, by Dr. Fricke, of Luneburg.

6th. Gum Affections, by Dr. Hamm, of Altona.

7th. Aluminum Sets, by G. Blume, of Munich.

8th. Artificial Palate, by S. C. Benson, of Stockholm.

9th. Seventh Annual Report of the Austrian Dental Association.

10th. Nitrous Oxide, by Dr. Ad. zur Nedden.

11th. Notes and Remarks.

Constitution of the Charleston Dental Association.—We have received a copy of the above document, and are gratified with this evidence of activity among the members of the profession in that locality. The officers are—President, J. B. Patrick; Vice-President, W. S. Brown; Secretary and Treasurer, Theodore F. Chupein.

Correspondence.

DENTAL ASSOCIATION.

MR. EDITOR:—Permit me to call the attention of the delegates to, and members of, the Dental Association which holds its annual meeting at Saratoga on the first Tuesday in August, to the desire intimated and expressed by some of making our next meeting additionally attractive and interesting by combining the social elements with our professional gathering, and to this end the Committee of Arrangements would suggest and urge the delegates and members to bring their wives and daughters with them, in the hope that by so doing additional interest will cluster around

our gathering, and add much to the pleasure and gratification to ourselves and those connected with us.

The committee will see that accommodations are provided for all who will give timely notice of their wishes, by addressing the chairman, stating what accommodations they require.

J. G. AMBLER, *Chairman*,
25 *W. 23d street.*

Selections.

CARBOLIC ACID AS A THERAPEUTIC AGENT.

Joseph Hirsh, in a paper lately read before the Chicago College of Pharmacy, gives an account of a series of experiments made by him, showing the power of carbolic acid to coagulate albumen, and adds some remarks upon the effect of this acid on the human system, the importance of which can hardly be over-estimated. The application of a concentrated solution of the acid to the skin produced in a short time a white opaque spot of horny aspect, which soon peeled off. The same spot produced on a highly sensitive part of the epidermis, as on the tongue, at once it loses its sensitiveness, and a feeling as of the presence of a foreign body as a coating is experienced. In both cases the opacity of the spot, by its resemblance to the opaque coagulated albumen, at once reveals the nature of the change produced by the acid. The albumen of the blood, which, through the numberless ramifications of the blood-vessels, is carried to the skin for its nourishment, becomes coagulated. In this state it is solid, precluding the motion of liquids of its own kind within its substance, and, with this motion, nourishment and life. As lifeless, dead matter, the skin must necessarily peel off; it must, with the loss of vitality, be deprived of all prerogatives of life, of feeling, as noticed above. Taking the coagulation of albumen as the immediate effect of applying carbolic acid to any organic substance, we shall find no difficulty in explaining the suspension of life, without its complete extinction, in the microscopical beings known as contagion. They contain, no matter whether they are animalculæ or minute plants, (a question not definitely settled,) albumen; blood albumen in the former case, and vegetable albumen in the second. Here the carbolic acid, coagulating the albumen on the surface of the corpuscle, forms an insoluble envelope, impenetrable to air, and to further quantities of carbolic acid, which in this manner forms an obstacle to the entrance of itself into the interior of the small body. This, then, retains in its centre a minute portion unchanged, full of life, capable of increase under favorable circumstances, and protected from external influences by its coating of coagulated albumen. Such a corpuscle, acted upon by carbolic acid, may be represented by an egg exposed to boiling water for a few seconds. The coagulating influence of heat affects the superficial layer of albumen, which still incloses the rest of the egg in its raw state. All substances or processes producing the same coagulating effect upon albumen, do, in reality, exert the same destructive influence upon contagion and miasma; but none possess other necessary properties qualifying them for this purpose as well as carbolic acid. Heat, which coagulates albumen, has been used successfully in the disinfection of places and clothing infested with

the poison of cholera, small-pox, yellow fever, &c.; but while we can turn high-pressure or even super-heated steam into a room, a ship, &c., we cannot subject a cholera patient, or an animal infected with the cattle-plague, to so high a temperature as to destroy the poison lurking within them; and if, in diluted carbolic acid we have a remedy which, with such coagulation, will destroy the activity of the contagion, without interfering with the process of life in the patient, we have found a desideratum which is at once a boon to mankind, and a victory of science important beyond comparison. Other chemicals, as the mineral acids, their salts, which coagulate albumen, precludes their use in contagious diseases, under the same circumstances, for similar reasons, under which super-heated steam is unavailable. On the other hand, carbolic acid in great dilution exerts a barely perceptible influence upon the vital processes of the larger animals, while its power of destroying sporules is almost equal to that of the concentrated acid. This apparent anomaly is easily explained on comparing its action to the parallel coagulation of a highly diluted solution of albumen by one similarly diluted of the acid. The diluted solution is as completely coagulated as a dense one; but the immense dilution places the particles of albumen at such great distances from each other that they can no more fotm a coherent mass after coagulation, but remain separately suspended in the liquid, rendering it opaque and milky in appearance. This liquid, although charged with insoluble albumen, will filter through paper, as also through the pores of all tissues of the animal organism. The dilute carbolic acid introduced into the system will, in the same manner, coagulate the albumen and sporules it meets on its passage in such subdivision that the coagulum can no longer form a dense coherent coating, as in the case during the application of the concentrated acid, while the minute particles of this coagulum, after filtering through the animal tissue, do not oppose an obstacle to the free passage of greater quantities of the carbolic acid or of the vital fluids. On the other hand, the sporules constituting the contagion are so minute themselves that the limited sphere of action of the diluted acid still embraces a complete sporule, or a number of them, which thus have their vitality suspended as completely as by the concentrated acid. The great divisibility (respective volatility of the acid,) prevents its complete neutralization by the albumen of the larger organism to the exclusion of that of the sporules, the albumen being a base of no great energy, especially if linked to as faint an acid as carbolic. Nevertheless, for a complete curative effect, the dose must be repeated, as the acid owns, in common with all other drugs, the property that the limit of its sphere of action is proportionate to its amount.

HEMORRHAGE AFTER EXTRACTION OF TEETH.

A correspondent of the *Lancet* writes, "troublesome hemorrhage sometimes follows the extraction of a tooth. A case of this kind occurred a short time ago, in which bleeding continued for six or seven hours, until it was stopped by the following treatment, the effect of which is immediate and permanent, and gives no pain. I have treated five cases in the same manner: soften a bit of white wax, and mould it into a conical shape, about an inch long, and press it into the cavity, at first lightly, and then very firmly, so as to fill it. Cover this with a thick pad of lint, to retain it in its place, and bind the jaws together for a few hours with some kind of bandage."

EFFECT OF LIGHT ON MINERAL OILS.

Herr Grotowsky, of Halle on the Saale, Prussia, has made some remarkable communications on the new property of hydro-carbon oils, which was discovered by him. In exposing various kinds of such oils to the rays of light in glass balloons, he invariably found that they absorbed oxygen, and converted this gas into its allotropic condition, ozone. It was further ascertained that even the air was thus ozonized in well-corked vessels, the effect being to some degree dependent upon the color of the glass. The respective results were marked down after the space of three months. But before enumerating them, it will be proper to remark the term photogen is applied to oils from peat or bituminous coal, which distil between 212° and 552° F., having a specific gravity between 0.795 and 0.805. The name "solar oil" is given by the Germans to oils having a specific gravity of from 0.830 to 0.835, and distilling above a temperature of 550° F. The former are burned in lamps adapted for that object, the latter in Argand and Carcel lamps. The observations of Herr Grotowsky are the following.

1. Solar oil and photogen which were stored in barrels and cisterns, lined inside with iron, remained free from ozone, and could be completely burned.

2. Photogen and solar oil kept in balloons of white glass, wrapped up in straw, showed traces of ozone, but burned well otherwise. Both the color of the oil and that of the cork were found slightly changed.

3. Photogen and solar oil in balloons of white glass, painted black, showed traces of ozone. The oils were less changed than those noted in No. 2. The corks were not bleached.

4. Solar oil and photogen, which had been kept in unwrapped white glass balloons, were found to be strongly ozonized. They burned very badly, charred the wicks, and nearly extinguished the flame after burning for six or eight hours. The solar oil was turned strongly yellow, and showed an increase of 0.003 in its specific gravity.

5. Solar oil which had been exposed to the light in unwrapped balloons of green glass, gave strong indications of ozone. Though the wick became charred, the oil burned quite well, and was little changed in color.

6. Solar oil in balloons of green glass, painted black, was found to contain some ozone, but it burned perfectly well. That in green balloons, wrapped in straw, showed about the same results.

7. American kerosene which had been exposed to light in balloons of white glass, became strongly ozonized, so much so that it scarcely burned. The formerly bluish-white oil had assumed a vivid yellow tint, and its specific gravity was found to have increased 0.005.

8. American kerosene which had been kept in the dark for three months did not show any ozone, and burned perfectly.

The oils had been exposed to light from April to July, 1868. Those which had become strongly ozonized were changed in odor also, and the corks had become bleached, as if attacked by chlorine, while those in balloons, containing unaltered oils, were entirely unchanged in that respect.

A CEMENT FOR TEETH.—The French and German dentists prize highly the following formula as a cement for teeth: Finely powdered borax, 1 part; freshly calcined oxide of zinc, 9 parts; finely powdered silex, 2 parts; mix well together, and make a firm plastic mass.

DEATH FROM CARBOLIC ACID.

A London journal says that an inquiry was held on June 23d, by Mr. Richards, Deputy Coroner, at Sion House, Lower Clapton, relative to the death, from the inhalation of poison, of Mr. Capel Henry Berger, aged 28 years.

Mr. C. Berrow Berger, Sion House, said the deceased lived with him, and was a color manufacturer. He suffered for a fortnight past from a very severe toothache, but a dentist advised him to preserve the tooth and bear the pain. He was an accomplished chemist, and he tried all sorts of things to allay his sufferings. On Sunday, June 21, while at church, he had to sit in a great draught, and that brought on a relapse of the pain. In the afternoon he went to his room, according to his custom, and bolted himself in, for the purpose of spending some time in devotion. When his sister called him down to tea, she could not make him hear, and ultimately witness broke open the door, and found him lying dead on the floor, upon some flexible tubing which communicated with a bottle of carbolic acid. His face was quite black, and he had vomited. It was clear that he had died from the carbolic acid, but he had not committed suicide.

Dr. J. B. Metcalf said that the deceased had fixed an elastic tube, ten feet long, to a large glass jar of carbolic acid, and had then evidently seated himself in a chair, and had inserted the end of the tube in his mouth, for the purpose of allowing a drop of the liquid to fall on the tooth. He had a brass regulator on the tube to control the quantity of the acid, but it did not act efficiently, and the volatile poison overcame him, and he became giddy and fell. Being alone in the room, the poison continued flowing into his mouth, and the heart's action was stopped, and he died. The remedy which he tried was a new one. and the deceased was in the habit of recommending it to his friends. It should never be used without medical assistance.—*Med. and Surg. Reporter.*

FATAL HEMORRHAGE AFTER THE EXTRACTION OF A TOOTH.

Dr. Schunemann relates an interesting example of this occurrence. Its rarity may be judged of by the fact that it is the only case that has occurred among 9,442 tooth extractions performed in the Brunswick Hospital during 1859–'66. A molar tooth was easily removed from the jaw of a tailor, twenty-one years of age, on account of caries. The bleeding, without being great, persisted, in spite of astringents, and it was then stated that he, as well as his father and brother, were subjects of hemorrhagic diathesis. In the course of the night, severe bleeding came on, and he was brought to the hospital in an anæmic state, being scarcely conscious and his pulse hardly perceptible. The bleeding still continued, but was at last arrested by a conical cork plug. He was sufficiently recovered at the end of four days to leave the hospital, but having removed the plug next day, profuse bleeding came on again, and it could only be arrested after several applications of the actual cautery. His strength was reduced to the lowest ebb, but by the aid of stimuli he was rallied. At the end of three days, in spite of all warning, he again removed the plug, and the bleeding again recurred, and was arrested at the end of several hours by plugging and cautery. However, the patient's strength was too far gone to rally this time, and he died on the day week that the tooth had been extracted. The autopsy threw no light on the cause of the bleeding.—*Med. Times and Gaz., from Virchow's Archiv.*

THE THREE VARIETIES OF DYSPEPSIA.

Dr. Henry Browne, M. A., Manchester, recognizes three principal kinds of dyspepsia, which he calls respectively sulphuretted hydrogen dyspepsia, or that accompanied with "rotten egg" eructations; carbonic acid dyspepsia, or that evidenced by tasteless eructations; and butyric acid dyspepsia, in which the eructations are sour or acrid. To a patient suffering from the first named of these, he recommends abstinence from meat and eggs, and prescribes farinaceous diet, along with a mixture containing strong hydrochloric acid, chlorate of potash, filled up with a vegetable bitter. In the case of patients afflicted with carbonic acid dyspepsia, he orders a lean meat diet, and an avoidance of bread, potatoes and farinaceous diet generally; while to the third class he prescribes the use of sugar and fat. Dr. Browne is fond of pointing out the incalculable harm done to the digestive system by an immoderate indulgence in tea, and in his, as in every medical out-patient room, he finds abundant illustrations of his observations. These cases he styles "tea dyspepsia," and he relies for a cure of them upon a daily allowance of wine, regularity of meals and abstinence from tea. He insists very strongly on the necessity of wearing flannel, especially in the rheumatic diathesis; enjoining upon his patients the use not only of flannel jackets or shirts, but also of flannel drawers and woolen stockings; and he invariably adds this precept—"Never wear during the night the flannel clothing you have worn during the day, but change your flannel garments night and morning, taking care to have them well aired and dried in the meantime.—*Medical Times and Gazette and Braithwaite.*

DEATH FROM HYPODERMIC INJECTION.

Lantesson reports (*Journ. fur Kinderkrankheiten*, 1868, 217—225,) that he saw a child die in a few moments with convulsions, after he had injected several drops of liquor ferri sesquichlor. for nævus maternus. Dissection revealed large coagula in the roots of the great veins at the heart, and in the right auricle and ventricle.

He supposes that a vein of some size was wounded, and that the astringent thus got into the general circulation, coagulated the blood, and finally produced paralysis of the heart. He recommends that the flow of blood into neighboring venous plexuses should be prevented by pressure when we perform this operation.—*Med. and Surg. Reporter.*

Dr. N. Field, of Jeffersonville, Indiana, states that a boy about five years of age, in apparently good health, was suddenly attacked with an epileptic fit. Two weeks after he had another strong convulsion. No cause for the attack was then discovered. In a day or two the fits returned, and were repeated at short intervals, so that in ten days he must have had a thousand. Every resource in Dr. Field's power was exhausted to relieve him, and three eminent medical professors examined the child from head to foot, but no local irritation was detected. After a convulsion had passed off, and while he was still unconscious, he raised the upper lip as high as possible, and behold! the corona of the canine tooth, instead of having caused, by its pressure, the absorption of the root of the deciduous tooth, had passed behind it and forced it through the alveolus and gum into the lip. It was removed, and the convulsions ceased altogether.—*Western Journal of Medicine.*

PENGHAWAR DJAMBI.

A writer in the *Missouri Dental Journal* recommends the application of the penghawar djambi in hemorrhages of the mouth. It acts promptly, is simple in its application, and there is no disagreeable taste nor unpleasant action observed in its use—objections which are often urged against other remedies of this class. This substance is the hair-like scales with which the stems of a certain species of tree fern, found on the Isle of Java, are covered. As found in commerce, it presents a soft, silky, fibrous appearance, resembling asbestos, except in color, this being of a brownish yellow. In cases where continued hemorrhage follows the extraction of teeth, if from the margins of the gum, a compress made of the broken fibre applied to the bleeding surface, and retained there for a few moments, will shortly arrest it. When the hemorrhage is from the bottom of the socket, the styptic should be rolled into a firm tent as large as the cavity in the alveolus, and long enough to fill it. Introduce the tent with a pair of pointed tweezers, and with a smooth, blunt-pointed instrument, force it down to the bottom of the cavity, and retain it there for a short time with a compress. It does not stain or tarnish the instruments used in its application, an objection to which all other styptics are liable.

THE FEMALE PHYSICIAN QUESTION ABROAD.

The University of Zurich has already conferred the medical degree on Mdlle. Souslowa. Her experience, and that of her companions in Russia, is not the least interesting episode in the history of medicine studied under difficulties. In company with several other ladies, Mdlle. Souslowa began her studies at St. Petersburg in 1862, and attended for two years the lectures on natural philosophy, chemistry, and anatomy, at the Medico-Chirurgical Academy, without objection either by the professors or their fellow-students. Suddenly, however, an order came from the Imperial Government forbidding the professors to admit women to the scientific class of the academy. The reason given by the Government, was that "women did better as such when they knew nothing, and understood nothing." With one exception the female students were thus compelled to leave the classes. Mdlle. Souslowa then resolved to try her fortune abroad, and after some delay gained admission to the University of Zurich, with the result as above stated. She now intends to seek admission once more to the medical examinations at St. Petersburg, in order to obtain a legal qualification to practice in her own country.—*Med. and Sur. Reporter.*

TOOTH IN UPPER LIP.—*North Staffordshire Infirmary.*—(Under the care of Mr. W. H. Folker.)—"Albert H——, aged sixteen, joiner, was admitted into the above infirmary, on August 29, 1867, on account of a tumor existing in the substance of upper lip. The swelling was on the left of the median line, corresponding to the left central incisor tooth, and seemed to be formed of hypertrophied lip. It caused a good deal of deformity, as the patient was unable to accurately close his lips. The tumor felt hard, but was not painful. On carefully examining the swelling, a small aperture was perceived at its base; and, on passing a fine probe, a hard substance was felt, which was diagnosed to be a tooth.

"Aug. 31st.—An incision having been made through the tumor, a tooth

was found at its base. On attempting to extract it by the forceps, it was fractured; this proved to be owing to its peculiar shape, being of a crescentric form, and passing almost at right angles to the alveolus. After its removal the swelling disappeared, and the patient was discharged on the following day."—*The Lancet*.

CEMENT FOR BOTTLES CONTAINING VOLATILE LIQUIDS.—Chemists who have used a luting of melted sulphur for sealing bottles containing either, benzole, bisulphide of carbon, and other volatile liquids, will find it much more convenient and quite as effective to mix finely-ground litharge and concentrated glycerin, and apply the mixture as they would paint around the cork or stopper. The coating soon becomes extremely hard and air proof, but it can be easily removed with a knife.

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PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The Fourteenth Annual Session, 1869-'70.

Preliminary Lectures and Instructions.—The Dispensary and Laboratory of the College will be opened on the 1st of September, where ample opportunities will be afforded the student, until the close of the session, for the prosecution of the practical part of the profession, under the guidance and supervision of Demonstrators of known integrity and capability; and during October Preliminary Lectures will be delivered. In this month, as well as through the entire session, a clinical lecture will be given, and operations performed by one of the Professors every Saturday afternoon.

THE REGULAR SESSION

Will commence on the first Monday in November, and continue until the first of March ensuing. The course is so arranged that about eighteen lectures will be delivered each week on the various branches taught in the College. A synopsis of which is given below:

CHEMISTRY.

The Course of Instruction from this Chair will commence with the considerations of the forces that act upon matter, and the laws which govern those forces Chemical nomenclature, the individual elements, and the compounds resulting from their combination, will then be considered. The course will be illustrated by diagrams and such experiments as can be performed before the class.

MECHANICAL DENTISTRY AND METALLURGY.

The instructions from this chair will embrace—the proper fitting up of a dental laboratory, the use of tools, refining, melting, alloying, and working of the precious metals, and the properties and combinations or alloys of the base metals used by the dentist; the description of the materials, their preparation,

and the most approved formula for making porcelain teeth and blocks, together with the proper manner of compounding them; the history and properties of all substances called into requisition in making dental substitutes; the entire range of manipulation of the different materials used as a base, from the impression to the completion, and proper adjustment of the case in the mouth, and such other information as appertains to this chair. The lectures will be amply illustrated by specimens, models and diagrams, and the practical application will be given in the Laboratory, under the supervision of an accomplished Mechanical Dentist.

DENTAL PATHOLOGY AND THERAPEUTICS.

The lectures delivered from this chair will embrace General Pathology, Dental Pathology, the Pathological Relations of the Teeth to other parts of the System, together with a minute description of all special diseases that have any relation to Dental Surgery, or of interest to the Dentist. They will also include a careful examination of therapeutic agents and their general application. Their indication in the medical and surgical treatment of diseases of the mouth, both idiopathic and symptomatic, will be fully illustrated. Special attention will be directed to the application of all the Anæsthetic Agents.

ANATOMY AND SURGERY.

The instruction in this department will embrace a plain and comprehensive view of the structure of the human body. The lectures and the demonstrations will be given over *the dead body dissected for the express purpose* of elucidating the subject. With the same object, vivisections on the lower animals, while under the influence of an Anæsthetic Agent, will be employed. Such description of the comparative anatomy, microscopical structure and connections of the teeth, as their importance may demand, will be fully given. The valuable and extensive collections of Anatomical Preparations of the incumbent of this chair, consisting of wet and dried specimens, papier mache manikins, models in wood, and accurate French plates, will enable him to illustrate his course of lectures very clearly.

In addition to the above course, a Surgical Clinic will be held by Doctor Forbes during every week, for the purpose of performing such operations in oral and general Surgery as may be deemed advisable to advance the student in this particular branch of knowledge. The cases will be selected from a dispensary which the Faculty have established.

DENTAL HISTOLOGY AND OPERATIVE DENTISTRY.

The lectures of this department will embrace the comparative anatomy of the teeth, the functions and microscopical pecularities of the dental organs, the development of teeth and their component tissues. It will also include a full description of the materials and instruments used in operative dentistry, and will comprise a thorough elucidation of all the operations required of the Dental Practitioner, such as filling, extracting, regulating, &c. &c. A portion of the course will be devoted to a description of the microscope and the modes of preparing specimens. The incumbent of this chair will practically demonstrate in the clinic the theories taught.

PHYSIOLOGY AND HYGIENE.

The intention of the course on Physiology and Hygiene will be to convey a knowledge of the essential principles of general and human physiology, in such a mode as will best develop their application to the preservation of health. The subjects of physiology and hygiene will be, to some extent, interwoven, with a constant aim at clearness and simplicity of instruction.

CLINICAL INSTRUCTIONS.

In addition to the above, with the exception of Saturday, four hours are daily spent by the student in actual practice under the supervision of the Demonstrators.

In the Operative Department.—To afford every facility to the student to acquire a thorough practical knowledge of this branch, the operating rooms are furnished with twenty-eight chairs, so arranged as to command the best light, and all the appliances for comfort and use. To these chairs the students are assigned in classes, and certain hours are fixed for each member of the class to operate. Every student is required to provide his own instruments, except those for extracting. He is expected to keep them in perfect order, and will be provided with a place in which they can be locked when not in use.

In the Mechanical Department.—In the Laboratory are all the conveniences for the preparation of the metals, manufacture of teeth, single and block, mounting, &c. Every process known in the profession, which has any value to the mechanical dentist, is fully taught, and receipts of valuable compounds are freely imparted; and the student is required to go through all the necessary manipulations connected with the insertion of artificial teeth—from taking the impression of the mouth to the entire construction of the denture, and its proper adjustment in the mouth of the patient. Every student is required to furnish his own bench tools, and will be provided with a drawer which he can lock.

Practical Anatomy.—The great facilities for the study of practical anatomy to be found in Philadelphia, in several well ordered and supplied dissecting rooms, present to the student advantages for its prosecution superior to those offered in any other city.

Hospital Clinics.—In addition to the facilities afforded by the College for a thorough course of instruction in the theory and practice of dentistry, the celebrated hospitals and clinics of the city constantly enable the students to witness various important surgical operations which are highly interesting and instructive. The medical and surgical clinics of the Pennsylvania and Philadelphia Hospitals, two of the largest eleemosynary establishments in the world, are open to medical and dental students, free of charge.

FEES.

Matriculation, (paid but once,) - - - - - - - - - - -	$5 00
For the Course, (Demonstrator's ticket included,) - - - - -	100 00
Diploma, - - - - - - - - - - - - - - - -	30 00

TEXT BOOKS AND WORKS OF REFERENCE.

Leidy's or Gray's Anatomy; Carpenter's or Kirk's Physiology; United States Dispensatory; Pereira's, Biddle's or Stille's Therapeutics; Fownes' Elements of Chemistry; Regnault's Chemistry; Lehmann's Physiological Chemistry; Hartshorne's Principles and Practice of Medicine; Wood's Practice; Tomes' Dental Physiology and Surgery; Harris' Principles and Practice; Taft's Operative Dentistry; Richardson's Mechanical Dentistry; Wildman's Instructions in Vulcanite Work; Barker on Nitrous Oxide; Gross' or Erichsen's System of Surgery; Paget's Surgical Pathology, or other standard works on the subject.

QUALIFICATIONS FOR GRADUATION.

The candidate must be twenty-one years of age. He must have studied under a private preceptor at least two years, including his course of instruction at the College. Attendance on two full courses of lectures in this institution will be required, but satisfactory evidence of having attended one full course of lectures in any respectable dental or medical school, will be considered equivalent to the first course of lectures in this College. Also satisfactory evidence of having been in practice five years, inclusive of term of pupilage, will be considered equivalent to the first course of lectures.

The candidate for graduation must prepare a thesis upon some subject connected with the theory or practice of dentistry. He must treat thoroughly some patient requiring all the usual dental operations, and bring such patient before

the Professor of Operative Dentistry. He must, also, take up at least one artificial case, and after it is completed, bring his patient before the Professor of Mechanical Dentistry. He must, also, prepare a specimen case to be deposited in the College collection. The operations must be performed, and the work in the artificial cases done at the College building. He must also undergo an examination by the Faculty, when, if found qualified, he shall be recommended to the Board of Trustees: and, if approved by them, shall receive the degree of Doctor of Dental Surgery.

CANDIDATES FOR GRADUATION WHO HAVE NOT ATTENDED LECTURES.—Dentists who have been in continued practice since 1852, are eligible to be candidates for graduation without attendance on lectures. The candidate for graduation must present satisfactory evidence of his having been in practice for the allotted time, also of his good standing in the profession. He must prepare a thesis upon some subject connected with the theory or practice of dentistry. He must present specimens of his workmanship. He must undergo a satisfactory examination by the Faculty, on each of the branches taught by them: when, if qualified, he shall be recommended to the Board of Trustees, and if approved, shall receive the degree of Doctor of Dental Surgery. Of this class of graduates, the matriculation and diploma fees only are required.

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THE

DENTAL TIMES.

VOL. VII. PHILADELPHIA, OCTOBER, 1869. No. 2.

Original.

THE ENAMEL MEMBRANE AND THE MEMBRANA PRÆFORMATIVA.

BY DR. KOLLMANN, OF MUNICH.

[Translated by Henrietta Hirschfeld, D. D. S.]

Dr. Zur Nedden, in the July number of the *Deutsche Vierteljahrsschrift*, presents to the readers of that journal an abbreviated statement of Dr. K.'s work, without expressing an opinion in regard to the conclusions arrived at.

According to Dr. Kollmann, the enamel membrane, in the shape of a structureless membrane, exists without doubt at all times of life, as well in the deciduous tooth, still hidden in the jaw, as on the long-used permanent one. It has an exceedingly small diameter, from $\frac{1}{800}$ to $\frac{1}{1000}$ millimetre. It may be detached in large patches of diluted muriatic acid —5 to 100, or 10 to 100, be used, and in a few minutes may be drawn off from the whole crown. The use of stronger acids is injurious, as the development of gases will burst the membrane at different points, leaving only microscopic patches, which might easily be overlooked.* This membrane was isolated with dilute muriatic acid by Berzelius and Retzius, (1837.) They believed it to be on the internal instead of the external surface of the enamel, and the latter thought it the remnant of the membrana præformativa described by Raschkow.

By the use of stronger acids only a structureless membrane is found, but when more diluted, there remain polygonal markings, corresponding with the transverse section of the enamel fibres, (Kölliker,) which are sometimes very distinct. These markings are, however, not pits, but the outlines of the adherent and very translucent enamel prisms. It is easy to see these delicate, nearly amorphic enamel prisms near the cracks. That this is the case is also shown by the absence of these markings at other

* Hence it is quite brittle, and the asserted resistance against acids has its limits.—Z. N.

places in the same specimen, they being perfectly smooth and structureless. The enamel membrane may be taken from the teeth of adults or children. A granulated precipitate may be seen according to the action of the acid, which is sometimes laid out in punctuated regular lines, as I saw it in a calf. Sometimes remnants of the enamel, and other cells of the adjacent tissue, adhere to the structureless membrane if it be detached from a tooth still hidden in the jaw.

It is hard to understand how Tomes, Waldeyer and Hertz could declare this enamel membrane to be an artificial product. The supposition that it was the least calcified layer of enamel is indefensible, since it can be taken off, by muriatic acid, from the approximal surfaces of teeth of persons forty years of age. Even after treatment with alkalies it keeps its nature, and does not split into cells. Kollmann mentions, to avoid misunderstandings in regard to the existence of that structureless, calcified enamel membrane seen by him, that on teeth, immediately after cutting the gum, a delicate membrane can be distinguished by maceration in dilute muriatic acid, which is composed of 3–6 layers of polygonal cells, similar to those of the mucous membrane of the mouth. It may be seen on half-grown milk molars in men and animals. Erdl* found and recognized it as being composed of little flat cells. This membrane is only a dense layer of epithelium cells of the gum, which remains as a tight-fitting cap on the tooth while cutting through the last envelope. This tough membrane is well known to most dentists, as they are frequently requested to remove that peculiar yellow cover from young teeth, and which decidedly distinguishes the half-grown tooth from its white neighbor. The layer of horny cells covers the glossy enamel, giving it a yellowish dead appearance. It is therefore certain, that on teeth where the crowns are half way through the gum, a membrane may be taken off consisting of the horny epithelium of the mucous membrane: but this is only possible for a very short space of time. Its origin is the epithelium of the oral cavity, and not that of the enamel organ. *Under this is the calcified enamel membrane.*

According to the author, the membrana præformativa is an artificial production of the preparation, but is, however, the *youthful condition of the enamel membrane.*

Kollmann tries to prove the supposition of an independent existing membrana præformativa to be incorrect.

It is known that an internal and external epithelium can be distinguished on each enamel organ, and between both the enamel pulps. A clear conception is required of the so-called internal epithelium and the

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* Erdl. Investigations on the Structure of the Teeth of the Vertebrata, especially of the Rodents. Munich, 1841.

stratum intermedium, which Kollmann considers as belonging to the membrana adamantinæ, or enamel membrane.

This internal epithelium consists—1st. Of a layer of cylindrical cells, which are directed with their wide free ends toward the dentinal pulp, (enamel membrane of authors.) 2d. Of a layer $\frac{1}{30}$ Mm, polygonal, radiating, anastomosing cells, which are in close proximity and granulated, (the cells of the adjacent enamel pulp are also radiated and anastomozing, but are further separated.) The close accumulation of the cells outside of the layer of the cylindrical cells, in fresh as well as in the dried state, is the reason why, on sagittal sections, this layer appears somewhat dim, and undoubtedly makes the impression of a distinct tissue.

Under favorable circumstances it is possible to draw this cylinder epithelium, and the adjacent denser layer, in patches from the fresh but especially from the hardened specimen of the enamel organ. This may be the reason why it is described by Todd and Bowman as "basement membrane," and by Hannover as "membrana intermedia." Waldeyer prefers to call the layer "stratum intermedium."

The cylindrical cells of the membrana adamantinæ strongly resemble those of the Schneiderian membrane. Toward the inside they are cut transverse, and this transverse section in four to six-sides spaces, and even round sections are to be found. The remaining part of the cell corresponds to the section.

The enamel cells have a membrane. Waldeyer, Hertz and Wenzel* have confirmed its existence at the side walls of the cells, and it will not be doubted by any one. The outer end of the cell directed toward the stratum intermedium, is, as already mentioned, pointed and in direct connection with the processes of the polygonal, granulated cells of this layer.

Examination shows the contents of the cylindrical cells to consist of a molecular substance and a nucleus. Kollmann could not find the contents of the part near the enamel to be more minutely granulated. Nearly without exception, the nucleus is found in the part near the stratum intermedium. One glittering nucleus is nearly always found. He never saw two nuclei in one cell.

The investigation of the *free end of the cells* requires especial attention, for in the works of Waldeyer and Hertz† the observation is made, that this inner end is without a membrane. According to Kollmann, these cells also possess a membrane on their free ends, which is perfectly distinct.

We find in this case, as in many others, the contradictions arise from the different methods of investigation adopted.

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*Wenzel.—Investigations upon the Enamel Organ and the Enamel. Leipsig, 1867.

†Waldeyer.—Konigsberger Jahrbucher. Hertz. Virch. Arch., Vol. xxvii., 1866.

Kollmann has himself seen this inner end without a membrane, and is able to demonstrate it with and without a membrane. Tomes has found the enamel cells with wide borders toward the enamel prisms. Kollmann has observed the same, and has seen other cells with margins serrated like the calyx of the gentiana, and slightly turned back. At times the observer may be able to look down in the cylinder of the cells according to their position. This kind of cell termination is produced when the cell is isolated from the enamel on quite fresh specimens, or after short treatment with chromic acid. After a longer maceration in the already mentioned solutions, this separation occurs in a more delicate way. Then, however, the cells are not open, but covered with a distinct thick membrane of $\frac{1}{1000}$ to $\frac{1}{1800}$ Mm. These covers are very firmly united with the enamel, and it is only with especial caution that the separation can prove successful. Most of the observers have hitherto not succeeded; either the cell was torn off, so as to let the cover membrane adhere to the enamel prism, or the prisms break and remain in connection with the cell. In the first case, the cell is on its wide part without membrane; in the second, it is generally easy to detect the membrane between the enamel fibre in the shape of a light stripe or line, but it is either mistaken or not taken into consideration. Waldeyer,* for instance, has decidedly represented it in his figure 13, plate III., and on figure 10, of the same plate, is found a slight indication; but he says nothing about this line between cell and enamel prism. Hertz has given some thought regarding this line of demarkation. He failed to prove the membrana præformativa which should exist between enamel cells and enamel prisms. For this and other reasons he believes in a direct calcification of the enamel cells; but he cannot deny, that on young developing enamel the transition of the enamel cells into the enamel prisms is apparently *not a direct one.* He says, one sees, between two or more homogeneous chromic acid preparations, a light small zone, possibly resembling a membrane, which he could also sometimes distinctly demonstrate in isolating the single enamel cells in connection with the corresponding enamel prisms.

This light zone, figure 5, b, he considers as a part of the enamel cell, chemically different from the calcification of the prepared protoplasma layer. It is seen that this conspicuous light zone has not escaped the observer, and by repeating, without prejudice, the investigation of this critical spot, he will discover it to be the membrane of the enamel cell.

Kollmann has found that the cover membrane of the enamel cells may be removed with or without reagents, as a coherent pellicle, when the enamel is developed. Sometimes it is found detached in larger and sometimes in smaller spaces in the cells.

* Konigsberger Jahrbucher.

Often the membrane is seen spread over, arch-like, from one group of cells to the other, when the cells in the gap have been removed by an accident. Those incredulous minds, who doubt the efficiency of the reagents, may succeed in taking off a membrane by pressure. Beneath, the cells will be found with their wide ends uncovered. This pellicle, which can be taken off from the cells of the enamel organ, *during the development* of the tooth, is soft and flexible; in short, a membrane composed of a multitude of cell covers, on which may at this time be proved the effects of silver. *After the completion of the enamel these cell covers remain on the surface of the tooth to calcify. This is the origin of the enamel membrane.*

Kollmann discusses the works of Huxley and Lent, which contain positive results. Huxley* has undoubtedly seen the enamel membrane on teeth of the seventh month. He states the thickness to be from $\frac{1}{1000}$ to $\frac{1}{625}$ Mm, as he and others have found it. He has adopted an excellent method to exhibit this. The tooth, taken from the alveolus, has to be observed by a slight magnifying power under water, with the addition of strong acetic acid. The consequence is the loosening of the still soft membrane, and the melting away, like snow, of the enamel prisms. He has shown this delicate, structureless membrane, which was previously demonstrated in 1839, by Nasmyth on Mammalias, to Messrs. Busk and Quekett.

To explain why it is that it may be found on the tooth still hidden in the jaw, says Kollmann: "It is above mentioned, that the connection between the cells and enamel prisms is so firm that in the fresh state the cells nearly always break in the middle by tearing off from the enamel organ. This connection is not dissolved even after a maceration of several days in a weak solution of chromate of potassa. As a proof of this it is only necessary to refer to Tomes, Waldeyer and Hertz, who give diagrams of cells, with adherent pieces of broken enamel prisms. When Huxley treated teeth taken fresh from the alveoli, with the adherent cells of the young enamel, with acetic acid, and observing them slightly magnified, the remnants of the cells disappeared, the enamel prisms became dissolved, but the existing cell covers, between the two elements, remained as a structureless membrane, called by Huxley membrana præformativa. Isolated in that way, it must not be considered an element of the tooth pulp, as it has nothing to do with that organ, it having originated from the enamel organ; but it is readily understood why every observer, under such conditions, supposed it to be a membrane originally covering the tooth papilla." This explains Huxley's remark, "that all the tissues of the teeth are formed beneath the basement membrane of the pulp;"

* Huxley on the Development of the Teeth.—*Quar. Jour. of Micr. Sciences*, 1853.

indeed, *beneath it* occurs the development of the dentine; *beneath it*, that is to say, through the cover of the cylindrical cells, that of the enamel. These views differ only in this: Huxley says, under the membrane of the pulp, while Kollmann says, under the cover of the cylindrical cells.

Lent* agrees with Huxley on this question, and remarks, "that the enamel is developed beneath the membrana præformativa, and that this membrane and the enamel membrane are identical." He supports Huxley in the view that the whole tooth pulp is covered with the membrana præformativa, and that the membrana adamantinæ is situated upon it. In treating a transverse section of a tooth, in the first period of its development, with acetic acid, he saw the structureless membrane detaching itself from the enamel. Having a tooth on which all the dentine was not yet covered with enamel, he distinctly saw the manner in which the membrana præformativa passed from the pulp to the dentine, and then to the enamel covering the dentine. This description would be perfect if, instead of the term membrana præformativa, we substitute Kollmann's description, as given above, for this embryonical condition, namely, the whole of the coherent cell covers of the enamel organ.

In accordance with the results obtained, the substances forming the crown of the tooth must be arranged in the following order: The dentine is developed from the tooth pulp, with the assistance of the dentine cells. The enamel is deposited on the surface of the dentine by the cells of the enamel organ. The same firm, durable agglutinant, which binds the enamel prisms to each other, also produces the solid connection between enamel and dentine. The enamel cells are the elements of a secreting organ—enamel organ—and we find on their surface the enamel prisms, cut corresponding to the transverse section of their cells.

BERLIN, Prussia.

ODDS AND ENDS.

BY E. WILDMAN, M. D., D. D. S.

In the following medley, I propose, from time to time, to lay before our readers a series of formula and other matters that may be of practical use or of interest, as may occur to me or may be transcribed from my note book, without much regard to systematic arrangement, trusting that, at least, some of the younger members of our profession will find something therein of value to them. In doing so, I shall give recipes that have been tested and found good, not offering any others unless especially noted, and those well authenticated.

* Lent.—Journal of Zoology, Vol. vi., 1855.

Cements.—Cements for retaining teeth to plate in fitting them down, or to try in the mouth before placing in the investment:

1. Gum Mastic, 8 parts.
   Yellow Wax, 4 "
   Color, q. s.
2. Gum Damar, 7 parts.
   Yellow Wax, 4 "
   Color, q. s.
3. Rosin, 2 parts.
   Wax, 1 part.

Nos. 1 and 2 possess very similar properties, being sufficiently adhesive and strong to answer the desired end, and are preferable to No. 3, on account of being firmer and more readily cleaned off the work, prior to applying borax. Gum damar being so much less expensive than mastic, I use No. 2.

To make these cements, place the vessel containing the wax and gum over a moderate heat, just sufficient to melt them, and stir until thoroughly incorporated; then add the color in quantity to produce the desired shade. Venetian red, drop lake or vermilion may be used. When all of the ingredients are well mixed, pour into a basin of cold water. To form into sticks, immerse the cake in water sufficiently warm to render it plastic. It is preferable to color it, as it renders it more sightly, and, also, we are better able to detect minute particles adhering to parts where solder is desired to flow and remove them. If desirable, it may be perfumed by adding an odoriferous oil just before pouring into cold water.

The following makes an adhesive cement of a dark color, which may be made more agreeable to the eye by the addition of venetian red or vermilion. It answers a good purpose to attach specimens to pedestals, &c.

4. Rosin, 4 parts.
   Gutta Percha, 1 part.

First melt the rosin, then add the gutta percha, cut into shreds and stir until they are united.

No. 5 is a good water-proof cement, but does not possess much strength; it will resist the action of water much better than shellac. An iron vessel coated with this composition will be protected from oxidization. In proof, I tested it on an iron frame aquarium which, after a constant exposure to water for four years, remained intact.

5. Pitch, 4 oz.
   White Wax, 2½ oz.
   Gutta Percha, 3½ oz.

First melt the pitch and wax together; then add the gutta percha, cut

into shreds, a little at a time, and stir until they are thoroughly incorporated.

To make a cement for building up pebble work, &c., for an aquarium, add to the above, after the ingredients are united, white clay, perfectly dry and finely pulverized, in quantity about one-fourth the weight of the mass. In using the pebbles or articles to be joined, they should be warm, and the cement, in a fluid state, applied with a brush to the surfaces to be united.

Cap Cement, (6,) so called by the late Professor Farraday. It makes a good strong cement to attach wood to glass. The parts to be united should be made quite hot, the cement applied in a fluid state, then firmly pressed together and retained until cool.

6. Rosin, 5 parts.
Yellow Wax, 1 part.
Venetian Red, 1 part.

The venetian red should be thoroughly dried and in a very fine powder, introduced a little at a time, and stirred into the melted mass.

Shellac Cement.—Gum shellac makes an excellent strong cement for joining small surfaces of wood together, and in many cases is far more convenient than glue. The shellac should be flowed upon the surfaces to be joined, and then they should immediately be pressed firmly together while the shellac is in a fluid state; in a minute or two the pieces will be found firmly united.

A convenient way of preparing gum shellac for laboratory use is to fuse the gum, as found in the shops, in a suitable vessel over a slow fire, being careful not to raise the heat higher than just sufficient to melt the gum, and, when fused, cast it in a mould; when cooled sufficiently to be plastic, but not adhesive, it may be worked into sticks. In manipulating this or No. 2, the hands should be kept moist with water.

Alum Cement.—This is principally useful to the dentist in securing an instrument to a pearl handle; it is strong and durable, when not exposed to moisture, and at the same time colorless.

Take the common alum crystals, place in a spoon over a quick fire; the alum melts in its water of crystallization so as to become perfectly fluid; while in this state, apply to the parts to be united and press together.

To produce a good result, the whole operation must be performed expeditiously, care to be observed not to allow the water of crystallization to be driven off, or the fluid to cool before the parts are joined.

To Polish Ivory.—Remove any scratches or file marks that may be present with finely pulverized pumice stone moistened with water. Then wash the ivory and polish with prepared chalk, applied moist upon a piece of chamois leather, rubbing quickly.

To Polish Pearl.—Take very finely pulverized rotten stone and make into a thick paste by adding olive oil; then add sulphuric acid, (oil of vitriol,) a sufficient quantity to make into a thin paste.

This is to be applied on a velvet cork; rub quickly, and as soon as the pearl takes the polish wash it. This mixture, when properly applied, will give to pearl a brilliant polish.

PROFESSIONAL INGRATITUDE.

BY SAMUEL WELCHENS, D. D. S.

In establishing a literature for the dental profession, the question of professional ethics has heretofore been too much neglected. A scientific status should be the leading characteristic; but no profession can control even that element, where there is a moral looseness in principle and action upon the part of its practitioners. If the man who seeks a profession as a vocation in life is void of the principles of a gentleman, he will not regard the rules which govern that calling any more than he would be likely to respect those which give character and dignity to society.

In the various journals which contribute so largely to a solid literature in dentistry, this subject should be more developed, so that persons seeking the endowments of the profession might learn to know how to honor and sustain it in *all* its parts while enjoying its emoluments. Let the leading and controlling power be scientific research; but, at the same time, as a growing interest is being manifested in that department, a corresponding appreciation of a high-toned principle of action, whereby the dignity of the profession, as such, ought to be maintained, should show itself, not only in the office of the practitioner, but it should be worked up in our literature, and be made a part of a real, substantial dental education.

Dentistry has attained its present high position among kindred professions with an amazing rapidity; but in no single quality has it shown such a nobility of character, as in the helping hand it has given to the worthy but poor aspirant to its honors. It has advanced in dignity and excellence, in the very effort of fostering in its less fortunate members, the principles of growth and prosperity which have characterized its own development.

The inventive talent within its borders has bestowed upon it the largest variety of appliances, which, being compared and adapted to scientific practice by skillful hands, many of them have become essential adjuncts in the dental office; and thus, by a power above and beyond the mind and skill of the ordinary operator, he is carried forward into an easy practice, in a profession which otherwise would have been beyond his power to obtain.

Its literature has so arranged and developed its science, that the most ordinary powers of mind can comprehend the whole scope of theoretical

knowledge necessary to a good dental education; and the more solid instructions of the colleges, and in the private office, which is offered and obtained at a very low rate of compensation, renders the dental profession not only a high-toned scientific pursuit, but its honors and emoluments are within the reach of any man who has ambition enough to raise himself above the position of a daily laborer. And when all this is obtained—when the amateur is once in the profession—he is still carried forward and upward in this career by the exercises of the local societies, and the more general benefits of state and national associations, which are so easy of access, and in which he gets the opinions and experience of the best and most distinguished practitioners "without money and without price." Here a fund of interesting and useful instruction is imparted, such as must develop the man and the genius, where a proper interest is manifested, or where the mind seeks that improvement necessary to success in any calling in life.

With all these advantages, however, with every help which is graciously tendered to bolster up those who are weak and scarcely able to reach a meritorious position, or to foster those who are more fortunate, we find a manifest gravitation of mind and energy toward the earth. A low estimate of their own worth, and a corresponding low appreciation of the true excellence of their profession, leads them to use their energies in running both down to the level of a handicraft or trade, and thus dishonoring themselves by abusing the benefits thrown out by better men, which invited them to rich feasts of comfort and honor. *Such men are guilty of professional ingratitude of the very worst type.*

Perhaps the standard of the profession has heretofore been too low. It may be that the very facilities with which men have attained to its endowments have had the effect of corrupting their minds in regard to its merits, and destroying the energies they should have devoted to the work of improvement and development.

But, then, the incentive to the maintenance of a good moral character and of self-respect should prove a safeguard to any vocation, especially if such calling is to shield its devotee from want and distress; and to give his business a good name and a good face before the public, should be the first and paramount consideration.

It is only when a due respect is shown to our business by *ourselves*, that we can claim a proper appreciation of its offices and benefits from a community. No man, loose of morals, who reels from day to day through the streets as an habitual and confirmed inebriate, can make society believe that he has a high respect for virtue and sobriety.

So, also, in a profession. If the motives and aspirations of a practitioner are of a grovelling character, and a low estimate is placed upon his work

and attainments, and a narrow, contracted view is taken by *himself*, as these may be exhibited in bad conduct, inferior workmanship *and low prices*, the same estimate will be placed upon them by the community in which he lives, and he himself will suffer loss of caste and practice, and his profession will be obliged to succumb to the pressure, and in the end go under.

Such a man, whether a graduate of a college or a boasted carver of his own fortunes, *is a quack and an ingrate*, in the broadest and most emphatic sense of the term. To sustain himself in his waning fortunes, he will advertize largely. He will profess special skill in this and that operation, known to no other person in the craft. Superior work is offered at ruinous prices, and then a rush of low, gadding, huckstering custom will feed the quack machine, only in turn to be cheated out of money and teeth both; while, in return for such service, they will be just so many living advertisements in the general scheme of poisoning the public mind against the concern, and of running the profession down. An individual who would practice dentistry in this way does not so much injury to himself, as he does the profession which has fostered and nurtured his imbecility, until he acquired strength enough to strike a most damaging blow at its very vitals. This is what we mean by the term "*professional ingratitude.*"

To secure that degree of respectability to which any high-toned vocation has a right to lay claim, those who are its legitimate representatives should strive to honor it, not only by the observance of a code of ethics, or the cultivation of a good moral character, but by a proper and beneficial dispensation of its offices, so that, in the honoring thereof, the public may not suffer from a misplaced confidence in a profession or trade designed for the public good.

If we would stand free of the imputation of ingratitude to the calling of our choice, and to which we look for a livelihood, a standard of excellence should characterize every operation.

The man who would excel in dentistry, and do honor to his profession, must have a special care for the permanency and beauty of his work. Perfection should be the standard, and while the operator is striving to please himself, he should aim to give full satisfaction to the patient also. The *first movement—the first operation*—whether temporary or otherwise, especially in the case of a new patron, is that which is to establish you in his confidence. With such a purpose and such energy, no matter how obscure his locality or name—how mean his facilities for educational pursuits—how low or destructive the prices for the work of quacks around him, he will be appreciated by those whose good opinion is worth having. It will not only be in the community where he will be thus appreciated, but he will always hold an honorable position in the estimation of the best

men in his profession. With these cardinal virtues, and a corresponding degree of energy, no man will do discredit to his calling, but he will make his mark as a *positive character*.

Negative, slothful beings, add nothing to the elements from which they derive a living. It is your *positive man* who stands forth on the roll of honor, when his profession has reached the summit of its power, and is prepared to distribute its blessings to those who have been faithful and true to its life, during the period of its development.

LANCASTER, PA.

THE AIR CHAMBER, OR SUCTION CAVITY.

BY W. H. TRUEMAN, D. D. S.

[CONCLUDED.]

In the practical application of the air chamber, we find quite a variety of ideas, almost every dentist having his own peculiar notions in regard to position, shape, size, &c. While it is impossible to suggest or lay down any inflexible rules in regard to these several points, there are some general considerations we will endeavor to give.

If we carefully examine the various forces at work to displace an upper artificial denture, we will find they come to a focus at a point on the median line, immediately behind the rugæ; and pressure at this spot will be found to more successfully oppose them than at any other. This, we consider, the best position for the chamber, extending from the rugæ, or a little posterior, to within from ¼ to ⅛ inch from the edge of the plate. We often find it placed too far front, sometimes immediately over the rugæ—a position open to many objections. Their roughness and irregularity make it difficult to fit the edges of the cavity with sufficient accuracy: their soft and yielding nature allowing the edges to sink in, or the membranes to be drawn down, often give rise to considerable annoyance. The depressions, if accurately followed up by the plate, not only give more surface, but have a tendency to maintain the plate in position, an advantage entirely lost if they are covered by the chamber. And again, while the atmospheric pressure is distributed over the entire surface of the plate, we find there is a little more firmness immediately over the chamber. If the chamber is brought too near the front, the slight yielding of the gums, when the incisors are brought into use, allowing the plate to be tilted, will very often throw the posterior edge down, and destroy the suction. By placing it in the position indicated, we avoid this, and, in most cases, secure a smooth, unyielding surface for the chamber, at a point where its projection will be least noticed. As a rule, in all plates, partial or full, if we allow a margin of say from ⅛ to ¼ inch between the edge of the plate and the chamber, it will bring it into the most advantageous position we can select.

In regard to shape, the usual form approaching somewhat the general shape of the mouth—a triangle, with the angles rounded and the sides slightly curved outward, is by far the most practical. Fancy arrangements, hearts, shields, &c., may do very well for show cases, but in the mouth we find the lines of beauty and comfort run in curves. Sharp angles should be always avoided if we study our patient's ease and comfort. The size of the chamber may be about one-sixth the surface of the plate inside the alveolar ridge. It is advisable to make them smaller when the patient has not worn a plate before, as each plate must have the chamber a little larger than its predecessor. About one-sixteenth of an inch is mostly sufficient, though some cases where the mouth is soft may require them much deeper. In such cases, or where extra suction is required, it is better to use a Cleaveland chamber, with a large recess, than to increase either the size or depth excessively. We should use moderation in all things; there is a limit when the increased size or depth of a chamber ceases to be useful. We should remember, when we increase the size of the chamber, we *decrease* the bearing surface of the plate; and with an increase of depth, we trespass upon the domain of that useful but unruly member, whose owner will be very apt to complain of any attempt to interfere with the constitutional right to freedom of speech.

At the present time, there are two forms of chamber in use—the struck up, or Gilbert's, and the soldered, or Cleaveland. The first, being simple and easily made, is more generally used; and while in most cases it answers very well, it has not the perfect suction obtained with the other. It is all-important the edges should fit accurately, a difficult matter when the chamber is struck up, as everything depends upon the zinc cast; and in many cases, especially deep mouths, with all our care the sand will displace a little, making it very hard indeed to obtain *perfect* casts—even in the most favorable cases, where the plate is carefully driven up with a sharp set, it is very difficult to secure accuracy. The bevel we are obliged to give the wax of the model, to enable us to remove it from the sand in moulding, produces a chamber which can be and frequently is entirely filled up by the membranes. These difficulties can be readily obviated by using the Cleaveland chamber.

Among the number of different methods in use for making them, the following I consider the most practical: Make the zincs (I always use two for all plates, band or suction) in the usual manner, and proceed to make the plate. When it is well struck up and nearly finished, select a piece of copper the size, shape and thickness of the required chamber; fix this to the plate in the position it is intended to occupy by tacking with a little silver solder, just sufficient to hold it, and strike it up lightly with the first zinc. Sometimes this striking up in bending the copper to the cast will throw it out of position; if so, heat it up at the blow-pipe,

and return it with the soldering point or pliers. Now, strike up on the second cast, so as to drive the copper well into the lead, and then with a graver slightly enlarge and deepen this depression, taking care not to injure the edges. Now, take a piece of plate to form the cover, several numbers thinner than that of which the plate is made, and strike it up; trim it down, leaving an even margin of about a line, no more than will be covered up in soldering. Now, remove the copper from the plate, and proceed to cut the opening in the plate with the plate-punch, or a fine saw, and finish up with the file, taking care to have it a little smaller than the copper, so as to leave a little recess all around. During this operation, the plate is often bent a little, and requires annealing and re-striking up. Before doing so, file the plate up to the marks, and finish it; then place the cover with the copper in the lead, and strike up all together, (hard,) so as to set the edges of the cover close to the plate. Now, place the plate on the plaster cast, and with a hammer make the edges of the opening fit accurately all around, and finish them up perfectly smooth with sand-paper. After scraping where the solder is intended to flow, remove to the charcoal, borax, adjust the cover, and solder carefully. Some little care is required in heating up to prevent the borax displacing the cover. A clamp might be used, but they are so apt to bend the plate; a slight pressure with the soldering point, until the borax is thoroughly dry, is far better. A little experience will enable the operator to dispense even with this. In laying it on the charcoal, care should be used to have the plate well supported, especially with silver, or it may alter the fit. If the operation has been successful, and soldered smooth, there will be very little finishing up to do. The solder around the chamber stiffens the plate very much, and enables us in gold cases to use a much lighter plate without losing any strength.

In case a plate with a chamber like this should require re-making, it will be necessary to first remove it, which can be done by laying it on the charcoal, the chamber down, and carefully heating up until the solder is fused, when a sharp tap on the cover will remove it without injury, so that it can be used again.

The recess around the chamber adds very much to its usefulness. In several cases I have improved the suction of vulcanite cases by cutting a groove around the chamber with an excavator; in these cases the chambers were shallow, and entirely filled up.

Objection has been made to the Cleaveland chamber that the suction is sometimes so strong as to produce pain; a difficulty very readily removed by rounding off the edges with a file.

Although apparently a great deal of trouble, a little practice will enable a skillful operator to make these almost as rapidly as the others, if we take into account the time required to prepare the cast.

AMERICAN DENTAL ASSOCIATION.

DENTAL PATHOLOGY AND SURGERY.

[We subjoin a portion of the excellent report made for the *Dental Cosmos*, by Dr. W. C. Horne. Had we space to spare we should be glad to lay the whole of these discussions before our readers.—Ed.]

Dr. Atkinson, in concluding his report on the above subject, remarked that—

In consequence of a very little study in this direction, he was no longer able conscientiously to destroy the pulps of teeth under any circumstances; and, in testimony of the confidence with which he relied upon the doctrines here enunciated, he would detail a case which occurred the previous Friday. Female subject: superior canine tooth, exposed pulp; bled: touched with creasote, which arrested bleeding; filled with oxychloride of zinc; proceeded to work in another direction till the filling had set; then cut away oxychloride, leaving sufficient for a cap, and filled with gold; and if it is not a success he should be very much disappointed.

Dr. Buckingham.—What takes place between the oxychloride and the pulp?

Dr. Atkinson.—There is an affinity between the hydrochlorate of zinc (the fluid used with the oxide of zinc) and the albuminoid substance of the pulp, and at the point where the satisfaction is complete of this affinity an insoluble pellicle is formed. Beyond this, on the inner side, the coagulation is less and less, becoming simply astringent, collapsing the capillaries, driving the blood column—blood corpuscles and all—into the venous radicles, until the recoil of the column by the *vis a tergo* of the circulation reopens the arterial radicles and the capillary system, re-establishing healthy circulation, without the possibility of setting up the inflammatory process, or inducing the exudation of a single pus corpuscle. In case of a very weak pulp, and strong and abundant solution of the hydrochlorate, the coagulation may be effected to the foramen.

Dr. Buckingham.—Is there any pain during any part of the operation when the pulp is in a normal condition?

Dr. Atkinson.—Exposure itself is an abnormal state; but I have no pain manifested by my patients, nor the patients of those who have faithfully followed my directions, as far as reported to me, and I have had many of these. The reason of there being no pain is the free use of creasote. I never purposely destroy a pulp, and that dentist is weak or wicked who would do so.

Dr. Bogue.—How would you preserve a pulp that is exposed and partly suppurated?

Dr. Atkinson.—That question can best be answered by detailing my procedure in just such a case. A portion of the pulp had sloughed away. I resorted to my usual treatment in such cases, sopping the pulp with creasote, and covering with cotton and sandarac varnish; this dressing was continued for three weeks; at the end of that time the whole of the body of the pulp was converted into a mass of carbolate of albumen, and came away upon taking hold of it, leaving the legs in the roots in healthy and sensitive condition. Six other pulps in similar condition in the same mouth, were treated in the same manner without appreciable loss of sub-

stance. He was down on the death penalty; as long as there is life there is hope. Every man in dentistry should bring all his best powers into exercise in the practice of his profession, or he is a sinner.

Question.—Does the application of creasote tend to lessen the vitality of the pulp?

Dr. Atkinson.—Creasote destroys the periphery, which must be thrown off; and a pulp may be thus destroyed by continued applications. Iodine has such an affinity for some tissues as to stimulate some and destroy others, according to the amount of vigor they possess; the sick being killed and the weak being restored.

Question.—Has not the liquid part of the oxychloride of zinc the same action as the creasote?

Dr. Atkinson had never known a case of even a similar action; identity of result is an impossibility, because each exerts it own specific function according to its nature. That they each coagulate albumen is certain.

Dr. Wetherbee.—Is it not true, that if the oxychloride of zinc is used, without any excess of the fluid, the same result may be obtained without creasote as with it?

Dr. Atkinson.—That depends upon the temperament; in a low organization such a result might be attained. I always use creasote with it.

Dr. Wetherbee, when he finds an exposed pulp which has not bled, applies the oxychloride directly to it, only using creasote when the pulp is exposed and bled by the instrument, (as will sometimes happen even to the most skillful operator,) and that merely as an astringent. If the chloride of zinc, in coming in contact with the pulp, produces the same result as the creasote, why should the latter be used, unless it is preventive of pain? Is it true that the occurrence of pain endangers the life of the pulp? He believed not; and whether he applied the creasote or the oxychloride directly to the pulp, there was commonly a twinge of pain, which soon passed away, and was followed by no ill results. In those families which had been long under his charge, and where the teeth were inspected at regular intervals, he did not have occasion to perform any operations of this character; they were confined in the main to new patients. During the past year he had found no case of death of a pulp treated by him in the manner described. When he first commenced this method, it was with hesitancy and misgiving; but it proved so satisfactory that he had gone on, and now believes that, whatever the pathological conditions, they can be conquered. And here comes a wail from some one who has been unsuccessful; but he would say to that man, the fault is your own. He accounted for this unsuccess by supposing that the mixture was too hard when applied to the pulp, or that the cap had been broken in inserting the gold filling. Such failures should not be charged upon the material which proved so successful in abler hands.

Dr. Buckingham said he had tried to follow out all the directions given with the greatest care, but had not had uniform results. No surgeon could prognosticate how any case would turn out; no more could any dentist. He took exceptions to Dr. Atkinson's view of the condition of the pulp as acted upon by creasote. After sloughing and the application of creasote, there must be a cicatrix formed; the pulp must have a natural covering; it cannot tolerate the presence of a foreign substance without some degree of inflammation, which was likely at any time to be waked up into an active state.

Dr. Atkinson said there was no cicatrix; merely a new coagulum was formed; a pellicle, taking the place of the natural covering, dentine.

Dr. Buckingham.—You cannot form a coagulum which will not allow fluids to pass through it; even if it was as thick as leather, fluids would pass through it. In this way he had lost a number of cases, and therefore could not report uniform success.

Dr. Wetherbee.—Suppose there is an exudation from the pulp, is there no provision for taking it up? The oxychloride of zinc is porous; the best ever made will absorb moisture, and for that reason it is the best material for capping tooth pulps. It will absorb *liquor sanguinis*, or anything else, from the pulp, which comes in contact with it. It is sufficiently normal to insure success; and he believed 100 per cent. of cases would succeed if the cap were not broken.

Question.—Do you admit that if there is partial suppuration the rest of the pulp may have recuperative power?

Dr. Wetherbee had never seen such a thing, and did not believe in it. There are three classes of exposed pulps which he believed amenable to treatment. The first, where there is simple exposure; to these he applies the oxychloride, pure and simple. The second, where the pulp is exposed and wounded so as to bleed; here he applies creasote as an astringent and hæmostatic, followed by the oxychloride. The third, where the pulp is congested and has given considerable pain; here he would use means to reduce the congestion, and then fill as before, with confidence of success.

Dr. Butler.—Do you still think that it is injurious to the pulp to fill the whole of a large cavity with the oxychloride?

Dr. Wetherbee, in reply, mentioned a case which had come under his care, where, the pulps being exposed, a former operator had filled the cavities entirely with oxychloride, and these fillings had been renewed at times for three years; when he (Dr. W.) examined them the pulps were found all dead, and he attributed this to the continued action of an excess of the hydrochlorate.

Dr. Butler thought Dr. Wetherbee's position questionable. How could it be known just how much of the material to use, if such different results followed? He had used the oxychloride both as a cap and for an entire filling, and had found it to serve equally well.

Dr. Pearce said he must confess himself one of those who were weak and wicked enough to destroy pulps. Experience had shown him that the treatment which had been detailed was not reliable. On several occasions he had found, on cutting into teeth which had been filled in this manner, that the pulps were dead; while in other cases they were alive. He had not seen much to give him more confidence in the process of capping with oxychloride than with anything else. The theory of capping pulps, carried out with various modifications of material, had been extensively experimented upon for many years past, but the success had never come up to the expectations raised. With this state of feeling on his part, he generally transferred operations of this character, which showed indications of possible success, to his associate, who had more faith in them than he had.

Dr. Bogue thought cutting into teeth to test their vitality mere boy's play. A spicule of ice applied to the tooth was always a satisfactory test of its condition. Where suppuration of the pulp had far advanced, he

did not believe it was amenable to treatment. He kept exceedingly careful records of every case of pulp exposure treated by him, and had not lost one case of a healthy pulp, using the same means as described by the previous speakers. He had not yet learned how to arrest inflammatory action in the pulp, and would gladly receive instruction on that point from any one who was capable of imparting it.

Dr. McClelland believed erroneous views were entertained concerning the therapeutic action of the oxychloride of zinc. With a healthy pulp, its therapeutic properties amount to nothing; its only value was in its adaptability; gutta-percha would be just as useful, if it were as easy of manipulation.

Dr. Truman said that the success of this use of the oxychloride of zinc must necessarily overthrow the practice of twenty years; and he was not prepared, from anything he had seen or heard, to assert that the filling of roots was a failure. All know that the removal of the pulp is a success, just as far as amputation in surgery is a success, because it is the best thing to be done under certain circumstances. The subject had been treated vaguely by individuals, who asserted dogmatically, without producing facts in support. One asserts that there can be no failure; another admits some; while a third finds the failures to outbalance the successes. There must be a level of truth somewhere, but at this stage we can take nothing about it to be settled; it would require years of observation and experience to arrive at any positive conclusions. The theory of capping, which had been tried for years, was now an acknowledged failure. He had tried the oxychloride for two years faithfully, and believed in it. He had had failures, and thought every one must have them. Certain conditions admit of its use. He had never yet found a pulp dead from its use; but it was impossible to tell what the result might be, and he did not believe that ill success could always be charged to malpractice. It may be that there is something in its antiseptic properties which will preserve the appearance of the tooth after the pulp is dead; but no one can tell what is its mode of operation. These questions should all be studied out at home, and we should not come here to propound theories without an array of well-digested facts to sustain them. American dentists are very far in the rear in their theoretical knowledge; as far behind the Europeans in this department as the latter are behind the Americans in practical skill.

Dr. Searle said that he had had opportunity, during the year, of examining two teeth, filled in 1862 and 1863, of which records had been kept. In that of 1863, superior second bicuspid, the pulp bled, was capped with oxychloride, and filled with gold. In 1869 that filling had been removed; the pulp was found to be living and healthy. This tooth was removed on account of neuralgia. In that of 1862, an inferior first molar, the tooth had ached; it was filled as before. The pain was intolerable for two or three hours, then ceased: there was no subsequent return of pain, nor any discoloration. This tooth had also been removed, and, on opening it, the entire pulp was found to have dried up and disappeared; there was no fetor. In other cases inflammation had followed, generally in a very few days; where it goes on for a number of days without pain, he feels no apprehension, the tooth generally dying quietly, without discoloration.

Dr. Judd said the question to be discussed is not whether the practice is always successful, but is it judicious? We amputate limbs, and consider

that practice judicious under some circumstances. Let us inquire of ourselves, is it of any importance to preserve the dental pulp alive? Is a live tooth any better than a dead one? He believed, from experience and analogy, that a live pulp *is* better than a dead one. Philosophically considered, the nutritive processes go on at all times in teeth, in their normal condition, even in the enamel. Some think that there are no such changes; but it must be borne in mind that the enamel, dentine and cementum are all made up of hard and soft substances, and no one will deny that all soft tissues change. Take the case of a tooth, the pulp canal of which has been filled; it remained quiet for years, but the patient having an attack of measles, an abscess formed; this showed the necessity of the pulp to preserve the tooth under unfavorable circumstances. He considered it of the first importance, then, to save pulps alive; in many cases they do live under the oxychloride, and likewise die, and so also with gold. Many times teeth, the pulps of which were never uncovered, die even when filled with gold. He was not prepared to say under which circumstances most dead pulps were to be found; it was certain they were to be found under both. It was always time enough to kill a pulp; but once dead, it can never be brought to life again; it was, therefore, a judicious practice to preserve all, if possible, alive.

Pathology is a complicated and unknown subject; less is known of it than of any other in the broad domain of medicine. A few isolated facts and a vast number of theories, are all that we have to show of it. The very first step, etiology, puts us at fault; we know so little, definitely, of the causes of disease. He was unable to give a definition of what a cell is, though Dr. Atkinson undertook to explain it. The general idea of a cell is, that it is a small body with a cell-wall, fluid contents, and a nucleus; that each cell lives by itself, and has an influence on its neighbors. It is the opinion of Virchow, that each cell dominates a certain territory around it. If this definition of a cell is correct, the idea that it is the ultimate anatomical element is inadmissable. It has been settled, by the observations of Agassiz and Beale, that there are lower elements than cells capable of performing the functions of development. The ova of turtles were innumerable, and so small that they appeared, under a magnifying power of 17,000 diameters, to be mere homogeneous particles of germinal matter, yet they were capable of true growth. We must not, then, accord to the cell the honor of being the germinal particle.

The most generally accepted idea of the day, as to diseases, is that they are due to microscopic animals and plants, developed in living tissues. His attention had been especially called to this subject by a paper which accidentally came into his hands from Italy; in which the author claimed the discovery of the cholera plant, in the mucous membrane of the intestines of the deceased, which he believed to be the efficient cause of Asiatic cholera. Salsbury took up a similar doctrine. Polly gives much attention to the discovery of agents to destroy these growths, sulphurous acid being found the most deadly to them. Dr. Truman takes the same view of the origin of the green stain on the teeth; we know that this destroys the texture of the tooth, while tartar protects the structure.

It was not unusual to find a condition of very high sensibility in a part of the dentine of a tooth, and very near it a tract, almost or quite free of sensibility; and the question has often recurred to his mind how to account for it. He had made a great many sections with the purpose of determin-

ing this point; in many cases tracts were found in which the dentinal tubes were entirely obliterated, the whole structure consisting of calcified matter as far as the tract extended. In one case two entire quarters of the section were found destitute of nerve tubules, while the other portion was plentifully supplied with them. This condition afforded the most satisfactory elucidation to his mind of the absence of sensibility in some portions of a tooth, and its presence in others, showing it to depend on the nerve filaments in the dentinal tube.

Dr. McDonneld.—In all modes of treatment success is variable, because the conditions are variable. He had capped teeth by different methods, and on opening them, years after, had found the pulps dead, without having shown any outward signs of change. During the past year he had capped twenty exposed pulps in the method described by the previous speakers; one of these he knew to be dead. In making the application, he found that the degree of pain was regulated by the condition of the pulp; when freshly exposed, the pain was very slight, but it was greater and longer continued in accordance with the amount of congestion. While he was a great advocate for saving teeth, he did not think that anybody could be always successful; much must depend on the condition of the patient. If the exposed pulps were healthy, not one in fifty need be destroyed; it were better to adopt the oxychloride process, and then, even if they do die, there will probably be no pain nor discoloration of the teeth. Where, from the general diseased condition of the pulp, he considers a cure impossible, he removes it; but believes more suffering is generally caused in extirpation than in applying oxychloride.

Dr. Searle inquired whether the application of either creasote or oxychloride to the pulp was not similar in effect, and whether they are compatible with it.

Dr. Atkinson said that anything which contracts the tissues is an astringent, and this is the effect of creasote; it makes a solid mass of the coagulable portion of the pulp with which it comes in contact; the excess acting as a stimulant on the capillaries until its power is exhausted. Exactly the same thing occurs with the hydrochlorate (not oxychloride) of zinc; they are similar in effect, and their mode of action is the same. Any agent which effects coagulation deprives the tissue of the power of forming globules of pus.

Dr. Buckingham.—When the albumen is coagulated, will it ever become soluble again?

Dr. Atkinson.—Yes and no, dependent on the extent of the coagulation. The territory in which nutrient action takes place is always a collagenic or mucous mass, whether that be in the general juices of the flesh, or the sarcode, or in the anatomical elements denominated cells, where function is more differently elaborated. We only know a tissue by its anatomical elements, and this difference is that which constitutes the character of the cells. In a general way, teeth may be said to be osseous tissues; but this is too crude a definition to be of service to the histologist, physiologist or pathologist. There are three forms of hard dental tissue, known by the character of their cells, viz: enamel, dentine and cementum, and they are but differences of degree of calcification, under the dominion of typal presence. The last of these is so nearly like the bone cell as to be readily mistaken for it upon superficial examination. The formation of cells is always uniform in each kind. There is no physical distinction

between a cell-wall and its contents; it appears to be a homogeneous mass, and there is no cell with fluid contents.

DR. JUDD repeated that he had seen but one instance in which two full quarters of a horizontal section were made of calcified tracts, in which the tubules were entirely obliterated, and this was a very uncommon condition, though small tracts of the same character were commonly found. Dr. Atkinson thinks that the dentinal fibrils are mere extensions of nervous matter; I believe that within the tubules are true nerve filaments. The first layers of cells forming the exterior portion of the pulp, called "germinal matter" by Beale, penetrate the tubules, forming the soft fibres of Tomes. It must be borne in mind that Beale's investigations, to which we have referred, were made long after those of Tomes, and with vastly higher powers of observation. Beale saw that the terminal point of the nerve fibre, as described by his predecessors, was really not a terminal point, but only the point where it breaks up into an infinite number of fibrils in the germinal matter of the pulp. Now, there is room in the dentinal tubules for whole plexuses of these minute fibrils, and it is reasonable to suppose that they enter the tubules in common with the germinal matter—the tubules measuring $\frac{1}{10,000}$ of an inch, while these minute nerve filaments are but the $\frac{1}{100,000}$. Further than this, Beale has enunciated the doctrine that there are no terminations to the nerve fibrils, but that, like the electric force, their circuit is continuous, so that there is no break in their attachment to the nervous centres. It is a principle of the Baconian philosophy that known facts are superior to theories; and he accepted the facts developed by the advance of scientific investigation as a far more satisfactory elucidation of the question of sensibility in dentine than any of the fanciful theories which have been proposed.

DR. MCQUILLEN said that, regarding those present as representative men, understanding scientific principles, and familiar with elementary knowledge, he should not address them as students just entering upon the consideration of such matters; but, paying a decent respect to the intelligence and acquirements of his auditory, would present what he had to offer as to those qualified to have views and opinions of their own. He differed, in some respects, from the opinions advanced by Dr. Judd in relation to the character of the dentinal fibrils. Tomes directed attention to the fact that dentinal tubules are occupied by fibrillæ, and Beale concurred in that view; while the former was disposed to regard them as nerve fibres, neither had *asserted* them to be such. Beale, indeed, has spoken of them as *germinal matter* from which the *formed material*, or completed tissue is made. Dr. McQuillen has seen these fibres in examining pulps, but is disposed to think they are fluid rather than solid during life, and that their solidity under the microscope is due to a change after the removal of the tooth, like the change in the blood by coagulation. We have liquor sanguinis present in the pulp, and therefore the analogy might hold. He advanced this view suggestively, as it is impossible to demonstrate the fluidity or solidity of the contents of the tubules during life, because the structure can only be examined *post mortem*. Ten years ago, in making an examination of the pulps of the incisors of the calf, he had found no well-marked connection between the pulp and the walls of the cavity in which it was lodged, except at the end of the root, where the organic basis of the dentine had been formed, with a very slight deposit of the inorganic constituents. On making a longitudinal

section of the tooth, the pulp could be drawn out of the cavity without any force being exerted. Indeed, the weight of the pulp was sufficient to dislodge it when the divided tooth was held in such a position as to favor it. The connection at the root, however, was invariably so firm as to require considerable force to sever it. Within the past two months, in making some injections of the pulps of calves' teeth, he had obtained similar results to those just described, and it induced him now, as formerly, to question, if the dentinal fibrillæ, which he had observed projecting from these pulps, were really extensions of the pulps, how the latter could so readily part from the walls of the pulp cavity, where it would be right to infer they would be so firmly secured. Gulliver could not have been more firmly fastened to the ground when each hair of his head was tied by the Liliputians, than a pulp would be to the walls of a pulp cavity if solid fibrillæ passed directly from it into each tubule. In stating these views, he merely offered them for what they were worth, and with a full recognition of the fact that one has no right, except inferentially, to draw deductions from observations on animals and apply them to man. He would, therefore, direct attention to the ease with which the pulps of human teeth can be removed with a barbed probe—an incomprehensible operation if the supposed connection really existed. Let any one attempt to remove the periosteum from sound bone where direct connection exists, and find the character of the adhesion.

But we are met with the inquiry, Can any other than nerve substance transmit impressions through the tooth? He could see no reason why it might not. The air transmits sound, by waves of vibration, and if one end of a long stick be placed near the ear, and the other end be scratched by a pin, the sound would be transmitted along the stick to the ear; and sensations, in a similar manner, might be transmitted through the tooth to an impressible pulp.

As to the advisability of using oxychloride of zinc, he believed in trying whether a thing was good or bad. He had tried this preparation on exposed pulps in a number of cases—in two instances in particular, which he had watched. After a month, the teeth were in a comfortable condition, and possessed evidences of vitality in color, sensation, &c. What the future results would be, time alone could reveal.

Dr. Truman said that when Tomes made his first statement in regard to nerve fibres, ten years ago, investigations had not been carried to their present degree. The method he had pursued was extremely imperfect. Beale endorses Tomes' view, but calls the tubular contents germinal matter, and proves his position by the experiment with carmine. Since Beale, Boll of Germany has written upon the same subject, in which he asserts the existence of the nerve fibres, and proves it by experiments on the rodents. In this country similar experiments had been made. He was not prepared to admit the correctness of Dr. McQuillen's position. The best method of observing these fibrils is to prepare a section of a fresh tooth, and treat it with hydrochloric acid; this will remove the animal matter, and bring out the fibres on the slide by thousands. * As they present the peculiar appearance of nerve fibres, he was satisfied that they were such.

*Some explanation of this report seems necessary, though in the main it is correct as it stands. I remarked these fibres were to be seen by thousands, and from their marked resemblance to nerve fibres, I supposed they were of that character. That they had been acted upon with various re-agents, terchloride of gold coloring them, chromic acid destroying them

DR. BUCKINGHAM.—Is it necessary that a nerve fibre should be touched to cause sensation? It is not necessary. He favored the idea that the action in the cells is similar to the action in the galvanic battery—the wires representing the nerves. There is great similarity between chemical and physiological action. Where does the nerve fibre terminate? There is no necessity of its going to each cell, but only in its neighborhood; and the impression may be conveyed to any part, whether in a fluid or solid state.

DR. SHADOAN said that, in case of exposure, and the pulp membrane being wounded, his practice is very much like that of those who had spoken before him, with this difference: he applies creasote or carbolic acid until the hemorrhage has entirely ceased, then dries out the cavity thoroughly, and with a blunt-pointed instrument, of suitable size and shape, applies a single drop of collodion to the point of exposure, allowing the ether to evaporate; then, on applying the oxychloride of zinc, there is perfect protection to the nerve.

If the nerve is exposed, and not wounded, the application of the collodion will form an admirable protection from the immediate contact of the oxychloride. He found that, where this precaution was used, the pain is seldom appreciable, and often there is none at all. There is something in the manner of applying the paste. He found that the softer it is, the more pain and the less dense the mass when hard; and the harder the paste, so it is plastic enough for use, the harder it will become. There is no better way to apply it than by having all things ready to manipulate, and, having an instrument wound with a little cotton, dip it into a very thin solution of the fluid, and mop or wipe out the

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at the instant of contact. Taken in connection with the fact, that in a decalcified section these so-called fibres were plainly distinguished when properly torn, after Tomes' method; also, from the fact that on each fresh pulp drawn from a fractured tooth, they are plainly visible; and still further, that they are to be seen protruding from the tubes of every fractured piece of fresh tooth, render the conclusion unmistakable that the fibres developed by my process, if not nerve fibres, are at least the fibres that pass through the tubes. Since the meeting at which the above remarks were made, I submitted one of my specimens to the inspection of Dr. James Tyson, whose reputation, in this direction, as a microscopist, stands unrivalled in this city. He says: "I have carefully studied the portion of the tooth pulp you desired me to examine, and a number of my friends, of more or less experience, have also looked at it; and although we are all agreed that the *fibres present many of the characters of fine dark bordered nerve fibres in the fresh state*, we are unwilling to declare them such without further study of the pulps in different media." The italics are his. This opinion is a just if not a correct one, and it was all I expected from the single specimen presented. The course of investigation on this subject covers, with me, a period of over two years, and while I agree with Dr. T. that, in some respects, they do differ from fine dark-bordered nerve fibres, they differ equally as much from yellow elastic tissue, the other element they somewhat resemble.

But it is not my intention, at the present writing, to enter into a discussion on this much-disputed question. I only desire to give my process for removing all the animal matter in the tooth but the remains of the pulp and these fibres. It is simply to use hydrochloric acid of nearly *full strength*. The tooth is cut down longitudinally until the pulp is reached on both surfaces. It is then clamped by a spring to the glass slide, and placed in the acid. The action will not cease until every particle of the inorganic and organic material is removed, excepting that above mentioned. The time occupied in this will be proportioned to the strength of the acid. I prefer that this should be somewhat diluted, as that of full strength is apt to carry the process too far, and requires more careful watching. With acid of full strength, ten hours will be sufficient, but I have had the best results when kept in a weaker solution twenty-four hours. It is a singular fact, that the pulp and these fibres will remain for a week in the weaker form of acid with but little change. As soon as the pulp lies on the slide separate from other tissue, it is to be removed and subjected to the fumes of ammonia, then very carefully washed in clean water, covered and prepared for preservation. This has been a difficult part, and I have not yet been able to add anything as a preservative fluid without injuring the character of the fibres. They disappear entirely in glycerine, Canada balsam, &c. Carbolic acid solutions do very well, but great care must be observed in manipulating, or there will be displacement and injury. With this process adopted on *entirely fresh* teeth, the fibres will be present, in good specimens, in countless numbers, at times matted together, at others extending out, entirely isolated from each other. Bone can be treated in the same way, but my investigations have not gone very far in this direction, but sufficiently so to make me believe there is much yet to be learned in regard to that tissue.—J. T.

surface of the cavity, and apply the paste; then gently tap the tooth, and the paste will settle nicely and uniformly to the bottom of the cavity. If the paste proves rather soft after applying it, the excess of fluid may be taken up very readily by pressing some spunk or bibulous paper upon the surface. Oxychloride of zinc is valuable in filling the pulp chambers of teeth where the roots have been filled. It makes a firm foundation for the filling, and arrests thermal shocks, which are sometimes troublesome where the gold is continuous from the crown to the apex of the root.

Editorial.

A PARTING WORD WITH OUR READERS.

For several years as assistant, and for the past eighteen months as principal editor of the TIMES, I have been brought into intimate relations with a large circle of its readers. The position, though at all times one of labor and anxiety, has been both pleasant and profitable to myself, and I hope has not been without good results. It has been my endeavor to make this journal a combination of the practical with the theoretical, so that the two large sections in our profession might each receive that suited to their taste. That the success in this effort has been only partial, I am fully aware, but that some valuable truths have been ennunciated, must be apparent to those who have carefully perused these pages during the period first named.

The issuing of this number closes my connection with the TIMES. Circumstances, beyond my control, require a severance from the duties so long performed, but in doing so it is with no intention of retiring to inaction. The activities of the age require each one to labor to the best of his ability, and to neglect no opportunity for good. I shall, therefore, use the pen as time and inclination prompt, and give that work through proper channels.

To those who have so largely aided my efforts as contributors, I return my most grateful thanks, and hope they will continue their labors for this and other journals, nothwithstanding such work may not receive the full appreciation it deserves, at the hands of the careless reader.

The next number of the TIMES will be under the charge of another person, and *I wish it distinctly understood that my responsibility ceases with the present issue.*

The years that I have been connected with this journal, in various capacities, have been full of encouragement to all earnest workers. The process of elevation has been of slow but healthy growth, and as year has been added to year, there has been a corresponding increase of intelligence. In some respects, perhaps, there has been degeneration. The mechanical

department has suffered much in that period, but the gain in other directions, in my judgment, counterbalances this apparent loss. By a united effort we may still further advance, and make our loved profession honored and respected, wherever dentistry is known.

JAMES TRUMAN.

THE AMERICAN DENTAL ASSOCIATION.

The recent meeting of the American Dental Association, at Saratoga, was one of those pleasant interchanges between distant members of the same profession that necessarily can occur only at such a gathering. This is certainly a great, if not the greatest value, attached to such meetings.

While they are, theoretically, the channel through which the best and advanced thoughts of the members may find a circulation, past experience has shown that this has not been the case, and it is highly probable never will be, until a radical change is effected. There are good reasons for this apparent anomaly, the most prominent undoubtedly is the delay in publishing the proceedings. While a form suitable for preserving these in a permanent manner is advantageous, it has serious objections, one of these being the time necessarily consumed in their preparation for the press. Very few can be found who would willingly spend a large amount of valuable time in the investigation of a doubtful point, or who, having made undoubted discoveries or improvements, would be satisfied to wait six months or a year for their publication. Yet this is constantly the result, and after this period very few of those who really need the information ever get it, or if received at all, it has been shorn of its value by more recent and fresher work. It is to be hoped the time will come when this plan will be abandoned, and the work performed will go directly to those who require it, either through the agency of the dental journals, or else in a cheap form suitable for general distribution.

Such modes of advancing intelligence may have suited the pre-telegraphic age, but they have nothing to do with the active mental growth of the present time. The nearer and more quickly the combined active mentality of such a convention is brought in contact with that of the recipients, the better for all concerned. Those who are able to attend such meetings, and they are comparatively few, find ample return for the time and money spent in the interchange of views, the social reunions, and the *all* that goes to make such a gathering one to be looked forward to with pleasant anticipations, and to be remembered as hours full of profit and pleasure.

The discussions, the two days we were present, were marked by considerable ability, and were to us of great interest. It was apparent that,

as a profession, we are growing with a rapidity that promises a near future that will develop results commensurate with the increasing intelligence.

The report on pathology, read by Dr. Atkinson at the first meeting, led to remarks from various members, and took a wide range before the conclusion of the subject on the second day. The application of oxychloride of zinc, as a capping for exposed nerves, was dwelt upon at length, but we imagine with no definite result. It is too soon to dogmatize upon this treatment. Time alone can now solve the problem, and it would be perhaps wiser to carefully experiment and wait results. Many able practitioners were, however, fully satisfied with present experience, and had no hesitation in declaring the destruction of the pulp and the filling of the canals to be a practice of the past. We regard all such statements not only extravagant, but exceedingly injurious.

Dr. Palmer presented to the notice of the members diagrams and models, representing, with remarkable exactness, the various forms that caries assumes in its progress through tooth structure. We have never met more beautiful or exact imitations of nature than these specimens. Dr. P.'s idea was to exhibit the importance of removing all decay, following it up into the fissures, or wherever the faintest indication of a dark line may exist. It may seem surprising to some that so much labor should be needed to illustrate so plain a requirement; but it is undoubtedly true that an immense amount of bad work goes daily out of the hands of dentists, because they either will not appreciate this work, or are too careless to perform it. We have labored faithfully to impress the value of this fact for years, but have found great difficulty in securing a realizing sense of its paramount importance. It was therefore with no ordinary gratification that we witnessed so convincing a demonstration from one of the unquestioned ability of Dr. P. A vast many more teeth would be saved in this country if just such models could be lucidly explained to every association in the country.

Before leaving the Convention we felt it our duty to protest energetically against the incorporation of "permanent members" in the Constitution, which it was understood would be taken up for consideration at a future meeting. It must ever be a drawback, to all bodies of this character, to have a convention within a convention; or, in other words, two sets of members. The name "association," as applied to this body, is certainly a misnomer; that implies a voluntary union for a specified object, while this body is a delegated one, receiving its power to act from the local associations represented. It is therefore palpably improper to have men there who may or may not be members of local societies. It was therefore with gratification that we learned that the Constitution, as

finally adopted, while it did not remove entirely the objectionable feature, placed the whole matter on a more satisfactory basis.

We also took the liberty of introducing the following resolutions:

WHEREAS, The recent action of two of the oldest colleges of dentistry in this country, in admitting women to the full honors and duties of the profession, renders it imperative upon this national body to also take some action looking toward their admission into full fellowship in the profession; therefore be it

Resolved, That in view of the successful results attained in the education of women as dentists, we recommend to subordinate Associations to admit to full membership any woman duly qualified.

Resolved, That no considerations of sex should ever be permitted in consultations; ability and moral character alone being the standard of judgment in all cases.

The subsequent dodging of this question by the Convention, under the plea that they had no jurisdiction of the matter, was simply fleeing to Coward's Castle for refuge. It they had any opposition it should have been met openly, and not subject themselves to deserved contempt by the course adopted. That they had sufficient "jurisdiction" to recommend, cannot be doubted; that they could do anything more than this was not supposed. This question may be choked down for a few years, but that the time will come, and that speedily, when such narrow-minded selfishness will have an end, there can be no doubt. The progress of the age will properly level all such assumptions of superiority, and bring men to reason upon this subject in the light of that common justice that should exist between man and man. It is a question that far transcends many that are considered of vast moment, and we trust time will bring all to view it in that light, and treat it with some degree of manly courage and liberality. J. T.

DR. BLACK'S ARTICLE ON GOLD FOIL.

We hope none of our readers will pass over Dr. Black's paper, which we transfer from the *Missouri Dental Journal*, of July, to our "selection department." We deem it the most valuable production on this subject that has yet appeared, and enables us to explain much that has heretofore been involved in considerable obscurity. Whether his remedy to overcome the effects of the deposits on the foil will prove successful, remains to be proved, we think, although he has no doubt in regard to its efficiency. If, by the moderate use of ammoniacal fumes, our gold can be kept in good order until wanted for use, the fact will prove of great value to those obliged to keep it on hand for long periods of time.

WE are under obligations to Dr. F. R. Thomas, of this city, for additional abnormal specimens. Some of them are particularly valuable for their rarity.

S. S. WHITE'S NEW MOULDS OF TEETH.

We were exceedingly gratified a few days ago in inspecting new moulds of teeth prepared by Mr. Eli T. Starr, of S. S. White's manufactory. They excel, in our judgment, *anything of the kind heretofore attempted.* Modeled in almost exact imitation of nature, they present an artistic finish worthy of the highest commendation. It has been the opprobrium of all tooth manufacturers from the beginning, that while the anterior teeth simulated nature very nearly, the bicuspeds and molars were like nothing on earth, and we doubt anywhere else. Mr. Starr has succeeded in producing that slight inequality so common in superior laterals, and also in the inferior incisors, a feat in moulding that we consider remarkable. The inferior eye teeth are made to resemble nature, which, it is hardly necessary to say, they have not done heretofore.

We advise all who have not seen these teeth to call and examine a really beautiful work of art. The gratification that we enjoyed in a few moments' examination brought forth this *unsolicited* expression of it. Any genuine progress is worthy of every encouragement, and we think this is certainly one of that character.

Book Notices.

A Treatise on the Diseases and Surgery of the Mouth, Jaws and Associate Parts. By James E. Garretson, M. D., D. D. S. Philadelphia, J. B. Lippincott & Co., 1869.

We have received from the publishers the above volume of 700 closely printed pages. We regret that it came too late for an extended review in this number of the TIMES, and must therefore content ourselves with a brief glance at the contents.

The author prefaces it "with the hope that the volume will be a useful text book in assisting the student to prepare for the responsible duties of the profession, and a reliable guide to the intelligent practitioner."

That our readers may form some idea of the scope of the work, we subjoin the headings under which the different subjects are treated: Surgical Anatomy of the Mouth and Face, Dentition, Associative Lesions of First Dentition, Anomalies of Second Dentition and their Surgical Relations, The Teeth and their Diseases, including Alveolar Abscess, Trismus, Caries, Odontalgia, Salivary Calculus and Denudation, The Extraction of Teeth, General Anæsthesia, Salivary Fistulæ, Gums and their Diseases, Caries of the Maxillæ, Necrosis, Tumors of the Mouth, Exostosis, Exostosis and Subacute Inflammatory Tumors, Epulis, Osteo-Sarcoma, Osteo-Carcinoma, Epithelioma, Tumors of parts associated with

the Mouth, The Antrum of Highmore and its Diseases, Neuralgia, Wounds of the Mouth and Associate Parts, Ozæna, Fractures of the Maxillary Bones, Operations upon the Lips and Cheeks, The Tongue and its Diseases, The Aphthæ, Ranula, Palatine Defects and their Treatment, Resections of the Maxillary Bones.

It will be seen that to treat these subjects in detail in a satisfactory manner, requires ability of a theoretical as well as practical character, of a high order, and that the author has succeeded so well, with such a variety of subjects, requiring a variety of talent for their successful treatment, is sufficient commendation.

In those chapters more directly of interest to the dentist, we look in vain for that fullness of statement which properly belongs to a work designed to illustrate the latest thought on this particular branch. In a word, it seems to us that the author has confined himself too much to his own experience, not giving the recent work of other minds.

In the chapter on Caries the question is discussed as a chemico-vital action, and "markedly a trouble of hereditary transmission and predisposition." Upon these premises the author founds his explanation of the action of caries. He believes that in the depressions of the teeth are lodged "the various injesta of diet, acting, of course, as irritants, and producing, as I believe, just the same character of effects as would be produced in any bone; that is, inflammation, yet modified, of course, by differences which exist between the tooth bone and ordinary bone. It is, however, inflammation in the one case, and inflammation in the other; the matter of acids and alkalies have little to do with the matter, except as they are agents of irritation." In proof of this broad statement, "the resistive ability of common healthy dentine, from which enamel has been cut, so as to make the surface a self-cleansing one," is brought forward. According to our view, this is a feeble support to so positive a statement. The mere assertion that inflammation of dentine is the cause of the destruction found in teeth, predisposed by hereditary transmission, will not, we opine, carry with it much force. It is the same old statement, with no new facts to support it. We were in hopes to find, in opening at this chapter, at least a brief resumé of the more recent work on this subject of European observers. We speak of these, because we are not aware that any really fresh views have been promulgated upon this side of the water. We find nothing of the investigations of Tomes, Neumann, Leber and others, but have in their place the very valuable paper of Dr. James Paul; valuable in its suggestions, but leaving us as much in the dark as ever in regard to the immediate cause of the destruction manifested. While it is universally acknowledged that hereditary transmission is a predisposing cause of caries, the theory that acids have nothing to do

with it, except to irritate the tissue and produce inflammation, is an erroneous one, in the face of all the facts that have accumulated upon this subject. Whether Leber's views, founded on thorough investigation, can be sustained or not, it must be evident to any candid mind that they are *based* on facts that *cannot be gainsayed*, and we think they should have had a place in a work of this character. Any neglect of this kind very properly subjects the author either to the charge of ignorance, or else a desire to sustain a previously formed theory. We are not prepared to believe either of these conclusions applicable in the present instance.

In the chapter on Alveolar Abscess, we notice an allusion to a small operation for its treatment, that goes far to indicate a want of exact information that is hardly excusable. He says: "take up a spear-pointed drill, and pierce through the outer plate of bone in the cavity which the sac is being developed; break up this sac, and by means of a delicate tent keep the wound patulous for a few hours. * * * This little operation is, I believe, original with myself; indeed, *I do not know that it ever has been performed even yet by any one else.*" We must take exception to this conclusion in order to set our friend right. The operation has been constantly practiced for the last twenty years at least, and we presume all intelligent practitioners have recourse to this operation whenever necessary. Such loose statements are objectionable, as their tendency is to throw discredit on more important matters.

That portion of the work devoted to the treatment of caries by filling, will hardly be considered full enough for a text book. Indeed, we think it might have been omitted altogether as far as any practical advantages are likely to accrue to the student. The statement that the filling of teeth "requires only practice to become a proficient," is certainly unworthy one standing as high as the author. It is placing an important and extremely difficult operation in a contemptuous light, though such may not have been intended. *Practice never made perfect in anything.* It only *confirms*. Proof of this is unnecessary. It must be apparent to every observing mind that a half century of practice will not improve an operator if he fails to intelligently use present attainments as a base for further acquirement.

Under the head of Gums and their Diseases, we find, in writing of tartar, the following: "it is very common to observe a greenish deposit, particularly upon the robust and uncleanly, which, so far as I have observed, seldom results in any particular harm." This is a statement liable to most mischevious results. That it is without a shadow of fact to sustain it, must be true to every observer. That the injurious results may be slow in very dense teeth, may be admitted; but that this extremely acid matter can be deposited anywhere, and not result in injury, is not

credible in theory, nor is it borne out by observation. It is notoriously the *most destructive of all the depositions*, being largely composed of fungi, that exist only in an acid menstruum. It is certainly the very best illustration of the destruction of tooth structure, by an acid deposit, that we have; and it could be used as a forcible illustration of the weakness of our author's argument in his chapter on Dental Caries. We lay particular stress upon this statement, for this work will be extensively read by students, and will most certainly mislead them in this particular to their own and patient's great injury.

But we have not space or time to enter into a criticism of the work in detail. We have selected some points that we consider as blemishes. It is not possible to expect or to attain perfection in a work of this magnitude, and we did not look for it. As a whole, we deem it a most valuable addition to the very meagre stock of dental literature, and we feel that Dr. Garretson deserves the thanks of his colleagues for his laborious efforts to bring together so much valuable material for their instruction, and, may we say it, elevation. It should be in the hands of every dental student, but is perhaps better adapted to those whose experience enables them to critically discern errors of statement, some of which we have felt it our duty to point out.

We have received the July number of the *Deutsche Vierteljahrsschrift*, für Zahnheilkunde. Its contents are as follows:

1. Programme of the Annual Convention of the Central Association of German Dentists, to convene at Frankfort-on-the Main, in August.

2. A case of alveolar hemorrhage, by V. D. Tanzer, M. D.

3. The Philadelphia Dental College, by Dr. Adolph Petermann.

4. A reply to the opinion of our colleague, Humm, in regard to the loose thoughts of Dr. Hollander, by F. Kleinmann, of Flensburg.

5. The enamel membrane and the membrana præformativa, by Dr. Kollmann, of Munich.

6. A case in dental practice, by Dr. Tanzer.

7. Dr. Hofmockl, assistant surgeon in the surgical department of Professor V. Dumreicher, reports in the Vienna Medical Weekly, March 20th, 1869, a rare case of loss of speech in consequence of chloroform narcosis, for the purpose of extracting a sore, decayed molar. After two months of clinical treatment she was still unable to produce a sound. The patient is a girl of eighteen.

8. Miscellaneous.

9. Extracts from the proceedings of Dental Associations, and synopsis of American Dental Journals. We observe, Dr. Zur Nedden sharply,

and we think justly, criticises Dr. Cutler for his failure to give more than his mode of preparing a pulp for microscopic investigation, after he had *promised* to publish his mode of discovering the *millions* of nerve fibres.

10. Vegetable parasites of the human body, by Professor E. Hallier. This is an interesting and valuable article, but we are not able to transfer it to our pages in this number.

Selections.

GOLD FOIL.

BY DR. G. V. BLACK.

The first important question to the dentist after having received his gold foil from the beater or dealer is, how can it best be kept in good working order. If it is not kept in good condition, it matters little how or in what form it may be prepared, all operations with it will be faulty.

First, then, in learning how best to preserve the working properties of the gold, it becomes important to study intimately those influences which may be injurious, learn, as far as possible, what they are, how they act, and where they come from; then we may find the proper mode of counteracting them. First, we find that gold possessed of good welding properties gradually loses that important requisite by continued exposure to the ordinary atmosphere. In some cases this may be due to dust collecting upon it in such a manner as to prevent the surfaces from coming in intimate contact, thus preventing a union; but we have abundant proof that there is a far more subtle influence than this, and one far more difficult to counteract, for dust may be excluded with comparative ease.

The fact that gold loses its welding property by exposure to the atmosphere, points us directly to the effects of the gases upon it, especially those that may be found in the air as impurities; for the reason that by close observation we find that the atmospheric effect differs very materially at different times. You all know how common it is to find your gold, which worked well yesterday, work very badly to-day. Why this difference? is a very important question. It will be my effort to point out some of the causes for these differences, and the remedies, as far as I may be able. In prosecuting this enquiry, I have instituted a long series of experiments, in which I find certain gases neutral, others decidedly injurious, while others again seem possessed of a beneficial action.

Among the neutral gases stand all the simple or elementary gases except chlorine, the action of which is remarkable, and will be briefly considered farther on. Among those detrimental, all those gases containing phosphorous or sulphur stand prominent, while ammoniacal gas seems to stand almost alone as beneficial.

Many substances are neutral which might be supposed to be injurious. For instance, gold foil soaked in tincture of iodine, dried, and then annealed, is rather improved than injured, if any difference. The same is true of carbolic acid, ether, chloroform, alcohol, water, and most other substances usually found about the dentist's case.

The neutral gases need not be considered, but I will notice a few of those of decided action, giving the form of an experiment with each.

Sulphurous acid gas is produced directly from the burning of sulphur in the air, and is composed of one atom of sulphur united to two of oxygen; is possessed of decided acid properties, and has the smell of a burning match, and is produced in the dentist's office every time a match is lighted.

Experiment.—A test tube was filled with this gas by heating together oxide of manganese and flowers of sulphur, and some ropes of gold foil, part annealed and part soft, introduced. After standing twenty-four hours, it was removed and examined. The soft gold, on being annealed, gave off the gas sufficiently to be very noticeable to the smell, and with a slight crackling sound. The welding property was tried, and although it adhered somewhat, it was easily pulled apart again. The annealed gold was found perfectly soft—would not weld any more than so much tissue paper. On being re-annealed, it gave off the sulphurous fumes, &c., as the soft gold, but there was no restoration of the welding property by means of heat. You will notice the difference in the action of this gas on annealed and unannealed gold; and I will state that this distinction was plainly marked in all my experiments with this gas and some of the others.

And when I come to speak more particularly of annealing, I will give some reasons why it should be so

This gas is a dangerous one to the operator, for it is not only produced from burning matches, but is constantly exhaled from all sorts of rubber goods, with which the dentist's office is generally well stocked now-a-days. It is given off in very appreciable quantities in the trimming and finishing of rubber plates, in vulcanizing, and in all the operations with rubber, and wherever it may be. The truth of these statements is easily tested. For this purpose I placed some litmus paper in a drawer containing the rubber used as coffer dam; in a few days it was completely reddened. Some gold placed in the same drawer was affected similarly to that exposed to pure sulphurous acid, though not to so great an extent. In many of our cities the air is often rendered more or less sulphurous by the burning of sulphurous coal, and from other causes the air is often charged with this gas.

It is a somewhat curious fact that sulphur may be wrapped in a rope of gold foil and then burned out without injury to the gold, but this becomes plain when we find that this gas will condense on gold, or affect it only at comparatively low temperatures.

Phosphorus experiment.—A bottle was filled with phosphoric acid by burning phosphorus in oxygen gas, and some ropes of gold foil hung within for a few hours, after which it was examined. The annealed gold was found soft, and re-annealing failed to re-develop the welding property. The unannealed gold also refused to weld after being annealed, even at a bright red heat. After the bottle had remained uncorked ten or twelve hours, more gold was hung in it with precisely the same result. After the bottle had stood for one week, more gold was hung in it, and the effect found to be the same. Phosphorus is employed in making matches, and is given off in the form of this gas whenever they are burned; it is also formed from the spontaneous combustion of phosphoretted hydrogen gas, which is produced from the decay of animal and vegetable matter, together with sulphuretted hydrogen. Thus we see we cannot consider ourselves entirely free from it at any time, and that it will ruin the welding property of our gold.

Sulphuretted hydrogen experiment.—A test tube was filled with sulphuretted hydrogen by decomposing muriatic acid with sulphuret of antimony, and some ropes of gold, part annealed and part soft, placed within. After twenty-four hours the gold was removed and examined. No change in the appearance of the gold was observed. On bringing the rope into a strong alcoholic flame there was a distinct crackling sound, and the rope was burst open in a number of places by the escaping gas, which burned visibly. It does not seem to be driven off until a bright red heat is produced. The welding property could, in no one of the experiments, be reproduced by re-annealing the pre-annealed gold. In some cases there was a feeble show of adhesiveness in the unannealed gold, after annealing, but not enough to be of any practical advantage. After digesting the rope in aqua ammonia for a few minutes, and then drying at a gentle heat, a white sublimate is obtained on annealing, which may be collected on a cold glass held above. This is probably the sulphide of ammonia. If any one should be skeptical in regard to the actual condensation of the gases upon gold foil, this experiment must be sufficient proof to do away with all doubts, particularly when a similar phenomenon occurs with some other gases. This gas is exhaled in large quantities from all decaying animal substances, and the air generally contains some of it, though the proportion is usually small. But it is clear that it has a tendency to condense upon the gold, and may be collected upon it from the air. And then it may be actually produced in the dentist's office. Blood left in a spittoon over Sunday, or even over night, in warm weather, may exhale enough of this gas to spoil all the gold exposed to its action. It may be exhaled by old teeth, or any animal matter whatever, which may, by any oversight, be left until putrefaction takes place.

The effect produced by burning matches seems to be very irregular, sometimes being that of sulphurous and again that of phosphoric acid, and sometimes different from either. The effect is almost uniformly ruinous on recently annealed gold; but soft gold will sometimes weld after being subjected to it and then annealed, and again it refuses to do so, and again it occasionally happens, that ammonia fails to effect a restoration. The ruinous effects of the exhalations from the skin are well known to the profession, and need not be dwelt upon in this paper. My experiments confirm the generally received idea that they are always injurious, and further, that if the gold be long exposed to them, the welding property will be entirely destroyed.

Many other gases might be mentioned, but I have discovered no others which are liable to be brought in contact with the gold, that exert any decided injurious effect.

Carbolic acid gas softens annealed gold, but the welding property is immediately restored by heat.

Common illuminating gas produces a peculiar spotting of the gold, making it look as if mercury had been sprinkled over it; these spots disappear before a moderate heat, and the gold is apparently uninjured.

Ammoniacal gas, or its solution in water, is found to be rather beneficial than otherwise, in its action on gold foil. It condenses on and removes the welding property of cohesive gold; but a very moderate heat will remove the ammonia, and cause the cohesiveness to return. When this property is lost by contact with some one of the gases mentioned, the condition may be improved, and the welding property entirely restored, in

many cases, by treating it with this gas. It will be seen that all those gases which are liable to come in contact with our gold and injure it are acid gases, which combine readily with ammonia, as an alkaline base to form certain salts. Those containing sulphur form sulphides or sulphates of ammonia, while phosphoric acid forms phosphate of ammonia.

With these facts before us, we cannot be at a loss for a moment in regard to its use. If ammonia be present in excess, we may be sure that any of the gases mentioned will be neutralized, and our gold perfectly protected.

It thus becomes an ever wakeful watch-dog, ready to step in at our bidding, take possession of our property, and destroy any intruder before harm can be done, and again deliver it up to us when it may be wanted.

A small bottle of ammonia set in the gold drawer, loosely corked, will be found sufficient to protect our gold from all harm.

Chlorine.—Chlorine gas, from its very decided action, possesses a peculiar interest, although it is not met with in the free state, and, therefore, is not liable to come in contact with our gold. I will give merely a synopsis of its peculiarities.

A bottle was filled with chlorine gas by the usual method, and a number of sheets of gold, in the form of rope, placed within it. After a few hours they were examined. The lustre of the gold was very perceptibly changed, being dull and of a different shade of yellow; when brought in contact with the skin a deep stain was produced, resembling that of iodine. The instrument with which it is handled turns black. Litmus paper is reddened quickly when both are dry; damp litmus, bottled with it in a clear bottle, is first reddened, then turns almost white. Paper dampened with a solution of iodide of potassium and starch is first blackened, but afterward shows a variety of colors, among which a very brilliant yellow is conspicuous; a piece of black velvet was changed to a very light brown; a small piece of the same was put into a very small tube, and the gold pressed in against it—after a few hours it was almost a clear white; the same was repeated with the gold and cloth perfectly dry—several days were required to produce the same result. The welding property of the gold was entirely lost, but was completely restored by re-annealing; when heated to redness a copious green flame is given off, which turns red when the heat is intense, presenting a beautiful appearance. When soaked in aqua ammonia, slowly dried, and then annealed, a white sublimate is obtained, which may be collected upon a cold glass held above—a single sheet of gold giving off enough to form a complete crust over a space of two to three inches in circumference; this substance is probably the chlorohydrate of ammonia. When a little water is poured over the gold in a test tube, it takes a yellowish color, almost identical with that of olive oil. I find that on the addition of water, the chlorine instantly attacks the gold and dissolves a portion of it, which it carries into the water, giving rise to this peculiar color; pure chlorine water is almost perfectly clear. Gold subjected to any of the sulphur gases is cleaned, and the welding property restored by subjecting it to chlorine and then annealing; but it fails in case of phosphoric acid.

I had hoped, in the first of my experiments with this gas, that gold treated with it might be employed for the purpose of bleaching discolored teeth; but the fact of its carrying a portion of the gold with it when moisture is present precludes its use, on account of the brownish stain

imparted by the gold. I hope this difficulty may be overcome, thus giving us a safe and efficient bleaching agent, which may be used without the least inconvenience to the patient.

Annealing.—The annealing of gold has received considerable attention from the profession, but perhaps not quite as much as it deserves, considering its great importance. The changes effected in gold foil by heat have been differently explained by different persons, and as yet there seems to be no received or fully accepted theory in regard to it. It is true we all know that the direct effect of annealing is to develop the welding property, and if this fails we conclude that there is something wrong with the gold; it has been thought that heat acted upon the arrangement of the atoms of the metal, producing such a condition that when brought into contact with a similar arrangement, the particles composing the two surfaces would interlock, and be held firmly together. This theory might seem to be supported by the fact that heat applied to large pieces of gold, or to plate, has the effect to soften them, evidently producing some molecular change—yet that there is another cause for the development of this peculiar property, I think is fully proven by the effects of the gases.

The welding of pure gold foil is prevented by the gases being condensed on its surface, thereby preventing intimate contact; the direct effect of annealing is to drive off such gases, and render the surfaces clean. To prove this, take a rope of gold foil, anneal it in a bath of dry carbonic acid gas for an hour or more; upon trial its cohesiveness is gone; you may put as much force upon it as you like, it will not weld, but is, perhaps, much softer than before annealing; bring this piece again under the influence of the ordinary annealing heat, and the property returns at once and as perfectly as before.

This experiment may be varied by substituting other gases for the carbonic acid, with a like result; some of the gases, however, refuse to be entirely driven off by the ordinary annealing heat, and if we experiment with them, the welding property does not return, as we have seen in the foregoing.

In case of chlorine, the condensation is so great as to perceptibly change the color of the metal, and when expelled by heat the voluminous green flame gives us the idea of a very considerable condensation. While the gas is on the gold, it is perfectly soft—will not stick together any more than tissue paper, though it might have been in a fine cohesive state only a few minutes before; as soon as the gas is driven off the property returns.

There seems to be a question as to the best heat for annealing. This, in my opinion, will depend entirely on the gas that may have possession of its surface. If it be carbonic acid—which is usually the case—the heat need not be raised quite to redness, for we find that gas to be driven off at a low temperature; if it be sulphuric acid, it should be heated as hot as possible without melting the gold, and kept so for some minutes, and even then it may not be perfectly cleaned. This is very much like the melting point of metals, or the boiling point of liquids—some melt at one point, some at another; some liquids boil at one point, and some at another. It is the same with the gases on gold, some are drawn off at a low temperature, while with some others the metal must actually melt before they leave it.

The gases do not leave the gold instantly at a given temperature, but the first is expelled at a comparatively low heat, and they continue to leave

it as the heat rises, until they are completely driven off. This enables us to acquire any degree of adhesiveness we may desire. Some parts of a filling may best be made of non-adhesive gold, while other parts require a perfectly coherent mass. By practice, all the gradations of adhesiveness may be attained and used with perfect facility; for this reason the alcohol flame and the annealing of each piece of gold as it may be wanted for use is to be preferred over all other methods.

It has become a custom to say that annealing gold hardens it. This is only true in appearance; the gold is actually softened, just as it is in plate. The gold appears stiffer for the reason that the laminæ of foil stick together whenever they come in contact, instead of sliding easily upon each other as in the case of unannealed gold; this gives the impression of increased hardness, while the facts are just the reverse.

The use of gold rendered adhesive by the beater seems to me to be unadvisable, for the reason that such gold is affected more and easier by deleterious agents in the air than soft gold. In all my experiments there has been a marked difference in intensity and quickness of action of the gases on annealed and unannealed gold; the recently annealed gold always suffering most. This is explained by the fact that any deleterious gases coming in contact with it finds its surface and its pores, (if they exist,) unoccupied, and consequently no resistance to its action. All plastic golds are affected by the gases to a far greater extent than foils, for the reason that their structure is so much better calculated to absorb and retain them. This needs no farther explanation, being palpable to every one; it makes the great difficulty of keeping these forms of gold in good working condition quite clear. I think that if those preparing this form would keep it strongly scented with ammonia, and the dentist do the same, until it is ready to be annealed preparatory to using, this difficulty would be entirely overcome.

Forms of gold.—A few words may be said of the manner of handling and forming the pieces of gold. This may be stated as a positive rule to which there should be no exception: that gold foil, the welding property of which is to be made use of, should never be touched with bare fingers, for the reason that the exhalations from the skin always injure this property more or less. The gold is easiest and most perfectly worked with the fingers neatly gloved with fine chamois skin or linen. These gloves should not remain on the hand any longer than is actually necessary to do the work, and should be very carefully kept. It may be thought that it would be inconvenient to handle the gold in them, but this soon wears away with practice, and becomes easier and the results more satisfactory than with any of the gold crumpers that I have seen. I notice some ingenious Yankee has gotten up a patent instrument for rolling up the ropes, which consists of two boards with a strip of rubber stretched between. This may produce a very nice rope, but after studying the effects of rubber on gold, I should not prefer it to the fingers. We should remember that it is not moisture merely that injures our gold, for that is driven off by annealing; but it is the gases and solid residue from these exhalations, compared with which the sulphurous acid exhaled on rubbing rubber is no improvement. I would kindly suggest that he substitute a nice piece of chamois skin in place of the rubber.

The Block.—This form is best made by taking the amount of gold wanted in a single piece, and crumpling it loosely together, and then bringing it

into a square form with a pair of flat-bladed thumb pliers. The whole operation should be conducted in such a manner that the finished block will be of equal density throughout.

Ovoid Pellets are made in the same manner as the block, except that they are rolled to the desired size and shape—round or oblong—with the gloved fingers.

The Rope is made by folding a sheet or part of a sheet of gold loosely together into a long round roll, and then twisting it into a moderately compact rope. It is also made by rolling the gold in a napkin, and by crumpers, but much the best form is produced by the fingers gloved with chamois skin or linen.

The Pellet is produced by cutting the *Rope* into short lengths. I am using a pair of shears prepared with a graduated scale attached to one of the blades, with which the length of each pellet is definitely and easily measured as it is cut, without any loss of time whatever. This is a very convenient and useful instrument to those who may wish to adopt definite sizes of the pellet.

The Ribbon is best produced by using two prism-shaped blocks of convenient lengths, (one side about half the length of each of the others is the most convenient form.) A paper knife or ivory spatula may be used instead of the second block. The gold is laid on a piece of velvet, the thin edge of one of the blocks placed on its centre—the second block is now passed under the edge of the sheet, which is folded over the first, which is withdrawn, and the gold brought down smoothly by passing the block over it. This operation is repeated until the desired width is obtained, and the ribbon is ready for use. I know of no other mode of producing ribbon which can compare with this for perfection or ease to the operator.

The Cylinder is made by rolling a ribbon smoothly and compactly upon a broach or four-sided drill, as a ribbon is rolled upon a block, then by rolling the broach or drill backward it is loosened, and the cylinder removed. The width of the ribbon should equal the desired length of the cylinder. Many other forms have been used, more or less, but they are generally modifications of those given, and hardly require separate consideration.

The form in which gold foil may best be used in filling teeth, is a question of no small importance, and deserves much careful consideration. We want that form which may best be impacted securely and perfectly into grooves and retaining pits, and against the walls of the cavity. Compared with these points solidity itself is a secondary consideration. If our form of foil should not admit of the ready accomplishment of these objects, our whole work is liable to fail, no matter how solid other parts of the filling may be, or how beautiful it may appear. To meet these requirements our form of gold should be very impressible, and take readily the form of the wall of the cavity against which it may be impacted. These requirements seem to be most perfectly met by the form of the block. This form of gold is soft and sponge-like, may be pulled this way or pushed that way with the plugger, and adapts itself most perfectly to the walls of the cavity, but has the objection that it requires more labor to consolidate it perfectly than most other forms, on account of the many wrinkles and sharp angles which must be beaten out. This objection is perhaps much greater in theory than in actual practice, and whether it is or not, the impac-

tion against the walls is of much more importance, as before stated, than the actual solidity of the body of the work: provided always, that the solidity is sufficient for the ordinary wear and tear of mastication, which is easily attained with these blocks. The working of the ovoid pellet is about the same as the block. The next form nearest resembling the block is the pellet. This form is not crumpled quite so much as the block, yet is almost as soft, and is well adapted to working into small cavities or retaining pits, grooves and undercuts. The use of pellets cut from ropes larger than these made from a single sheet of No. 4 gold is objectionable, on account of the condensation which occurs at the ends of the pellets in cutting them. The ease and rapidity with which they may be prepared is quite an item in their favor, in all cases where small pieces are needed. The rope has been much used in times past by beginning with one end and folding it into the cavity, condensing each fold as it is laid in. I think this practice is mostly abandoned on account of the obvious difficulty of keeping the rope free from the moisture of the mouth, and that it obscures the cavity too much.

The cylinder is a very popular form of gold with many operators, and seems to have been gaining ground for a number of years. It is used by setting it on end in the cavity to be filled, and condensing against one of its walls, or if it be an approximal cavity, by laying the end of the cylinder out over the wall. With this form of gold there are no angles to break down in condensing, so that the solidity is attained with less labor than with most other forms in use. In fact, the gold is placed in the cavity in a very smooth and compact state, so that little more condensation is required, and is generally used in pretty large masses, particularly if the cavity be large. It is not so easily impacted into any irregularities which may occur in the walls of the cavity, although in the main very great solidity is attained. At those points along the wall where two cylinders lie against each other, triangular openings are liable to occur. In case of approximal cavities where the plan is to lay the ends of the cylinders out over the walls, this may result in serious mischief. This may be illustrated by taking three little rolls or cylinders of paper, with square ends, and placing them together, a triangular opening will be observed in the centre; or if you take two of them and press them together against a flat surface, a similar opening will be observed between them. It will be found a very difficult matter to close these openings perfectly and solidly by any practical amount of pressure. If the space be filled at all it is apt to be filled very loosely. The difficulty is not lessened by substituting gold for paper, and I consider it a very grave objection to the general use of cylinders in filling teeth, especially in approximal cavities. I have myself been greatly mortified to find fillings which I had thought very perfect, imbibing moisture, causing decay to start, evidently from this cause; and have also noticed it in fillings made by some very fine operators. To overcome this trouble requires considerable manipulative skill, and much good judgment, and even then it seems to be a somewhat dangerous form of gold to use largely.

The ribbon cut in short lengths or folded in as rope, may be used in filling teeth; but is scarcely applicable to the filling of cavities, for the reason that it is too much condensed, and too many hard corners are liable to occur to allow it to be spread and impacted perfectly against the walls of the cavity. This form of gold cut into convenient lengths may be used

with great advantage in building up lost parts of teeth, after the cavity has been filled out even with the walls. In such cases the slips may be laid on smoothly, and condensed with less labor than any other form of gold. There seems to be very little attention paid by dentists to the size of the pieces of gold used; or, I should say, they do not adopt any regular system of sizes, but prepare their gold according to the size of the cavity to be filled. Now to prepare gold in such a manner as this, seems to me to be forever experimenting with vague and undefined sizes. And we cannot feel that degree of confidence and thorough knowledge of what is coming under our instrument that we should. I would recommend every operator to adopt some regular gradation of sizes which may be found convenient, and adhere to them closely in all their work.

A few weeks' observation will be sufficient to determine upon those sizes which will be most convenient for their range of operations. Then a known and fixed size of gold will be chosen to be worked to a given place as the eye may dictate, and there will be no vagueness as to the working of the piece under the instrument, for it will be perfectly familiar. Those who have not tried this plan will be surprised at the relief it will afford in all difficult operations. Instead of feeling their way along with perhaps some misgivings as to whether the gold prepared is going to suit the situation all the way through, they feel that they have definite and familiar sizes of gold at hand, at once adaptable to any situation; a view of which is always sufficient to determine the size or form to be taken. The adoption of such a system will be of no small advantage to those writing and speaking upon the subject, in making themselves understood, or in conveying a distinct idea of their plans to their brothers; for it is often the case that the size of the gold is as important as the form. We all perhaps feel how indistinctly our idea of the size of gold used in any given case is conveyed in any form of words used by the profession. We need some system by which an accurate idea of this kind may be easily expressed and generally understood. Then much of the vagueness which hangs around our operations when put in the form of words, would disappear. But such a state of things cannot possibly occur when operators cannot tell in words what size the pieces of gold used in such and such an operation should be. The plan which I have adopted, and which, perhaps, is as simple and as easily understood by all as any other, is that of naming each piece according to the number of grains, or the fraction of a grain contained in a piece. Thus, if a sheet of No. 4 foil be cut into four equal parts, and each part made into a block, they will be called one grain blocks; if it be divided into eight equal parts, they will be half grain pieces. No. 2 gold divided as the last will make one-fourth grain pieces. A sheet of No. 4 gold would make a four grain block or cylinder; a half sheet would make a two grain piece, and so on throughout all sizes that may be wanted. One number of foil is adapted to this system as well as another, and it is applied to all forms of gold alike. This plan presents an unlimited variety of sizes, a very few of which, when properly selected, will be found sufficient for any operation. Any one using any selection of these will understand readily what is meant when any one of them may be mentioned, whether they be sizes he is in the habit of using or not.

I am using half a dozen of these in my office for general use; 1 grain, $\frac{3}{4}$ grain and $\frac{1}{2}$ grain in the form of blocks, and $\frac{1}{4}$, $\frac{1}{8}$ and $\frac{1}{16}$ of a grain in the form of a pellet, and occasionally some of larger or smaller size. But in

whatever form my gold is prepared, it always takes these definite proportions.

I find this system very convenient in directing my assistant in the gold I may want; and, in fact, it is a convenience in every way you may put it.

The preparation of gold I make entirely the work of my assistant. She has her chamois skin gloves and all the necessary instruments in a convenient drawer, and, whatever else goes wrong, every piece of gold that comes to the tray to be used must be just right. And I have no hesitation in saying that it may be done as well, and often better, by a properly instructed assistant, than the operator would do it for himself. And more than this, I have my assistant do all my annealing. For this purpose she is supplied with some annealing forks, which are made by flattening an old excavator, splitting it up with a separating file, and sharpening the points. This will stick into any piece of gold, and hold it without condensing it, and is preferable to the foil pliers in general use. With one of these instruments she takes such a number and form as I may call for, passes it through the alcohol flame, and then into the cavity to be filled, when I take it with my plugger. And while I may be fixing it for the final condensation, she has taken up and annealed another piece, which is held while the first is condensed with the mallet, she always bringing the number called, and annealing lightly or otherwise, as may be directed. The position each should occupy in the cavity is pointed out by a slight motion of the point of the plugger over the spot.

I find this plan to work smoothly and well, and saves much valuable time in the annealing of the gold.

We started out with our gold foil at the time when it was received in good condition from the beater or dealer. We have been with it through that often dangerous interval which has been spent in the gold drawer, awaiting quietly its work of protection to some once beautiful and pearly organ of mastication, undergoing a slow destruction by the unrelenting destroyer. We have kept watch, as well as our feeble powers would admit, for those intruders which might endanger its usefulness, and have done our best to baffle their designs. We have seen the time roll round when it has been called to duty, and have watched anxiously while it has been made to take the forms best adapted to the peculiar duty assigned it, and have at last seen it nestled away solidly and snugly in the home invitingly made for it by the dispossessed monster, DENTAL CARIES.—*Missouri Dental Journal.*

ARTIFICIAL EBONY.

This substance is now being manufactured on a tolerably extensive scale. It is prepared, says a cotemporary, by taking sixty parts of seaweed charcoal, obtained by treating the seaweed for two hours in dilute sulphuric acid. Then drying and grinding it, and adding to it ten parts of liquid glue, five parts of gutta percha, and two and a half parts of India rubber, the last two dissolved in naptha; then adding ten parts of coal tar, five parts of pulverized sulphur, two parts of pulverized alum, and five parts of powdered resin, and treating the mixture to about 300° F. We thus obtain, after the mass has become cold, a material which, in color, hardness and capability of taking a polish, is equal in every respect to ebony, and much cheaper.—*Popular Science Review.*

THE RELATION OF THE OSSEOUS MEDULLA TO THE BLOOD.

The British *Medical Journal*, in abstracting a recent paper by Herr Neumann, in the German *Centralblats*, calls attention to the fact that Neuman's startling theory, that the marrow develops blood cells, has received conformation by the observations of M. Bizzozero. Among other things this observer says, that the condition of the marrow in the bones of hogs in winter, as compared with summer, furnish an important argument in favor of the theory that marrow is a blood gland. In winter, the white corpuscles in the blood of the hog are not half so numerous as they are in summer, and in winter the marrow consists almost entirely of fat cells; whereas, in summer, it contains hardly anything but lymphoid cells. He examined the costal marrow and the spleen in five cases of death from typhoid fever, and observed in both structures an enormous increase of cells containing blood corpuscles.

SULPHUROUS acid gas, it has been shown by Coignet, of Paris, will dissolve out the earthy salts of bones more conveniently than hydrochloric acid for the preparation of gelatine.

PROF. HORSFORD, of Yale College, has shown that fluorine exists with phosphoric acid in human brain.

PROF. CLOXAM, of London, asserts that a mixture of tincture of guaiacum, with ozonosed ether, produces, with blood stains, even old ones, a beautiful blue tint.—*London Quarterly Journal of Science.*

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1206 *Vine Street.*

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The Fourteenth Annual Session, 1869-'70.

Preliminary Lectures and Instructions.—The Dispensary and Laboratory of the College will be opened on the 1st of September, where ample opportunities will be afforded the student, until the close of the session, for the prosecution of the practical part of the profession, under the guidance and supervision of Demonstrators of known integrity and capability; and during October Preliminary Lectures will be delivered. In this month, as well as through the entire session, a clinical lecture will be given, and operations performed by one of the Professors every Saturday afternoon.

THE REGULAR SESSION

Will commence on the first Monday in November, and continue until the first of March ensuing. The course is so arranged that about eighteen lectures will be delivered each week on the various branches taught in the College. A synopsis of which is given below:

CHEMISTRY.

The Course of Instruction from this Chair will commence with the considerations of the forces that act upon matter, and the laws which govern those forces Chemical nomenclature, the individual elements, and the compounds resulting from their combination, will then be considered. The course will be illustrated by diagrams and such experiments as can be performed before the class.

MECHANICAL DENTISTRY AND METALLURGY.

The instructions from this chair will embrace—the proper fitting up of a dental laboratory, the use of tools, refining, melting, alloying, and working of the precious metals, and the properties and combinations or alloys of the base metals used by the dentist; the description of the materials, their preparation, and the most approved formula for making porcelain teeth and blocks, together with the proper manner of compounding them; the history and properties of all substances called into requisition in making dental substitutes; the entire range of manipulation of the different materials used as a base, from the impression to the completion, and proper adjustment of the case in the mouth, and such other information as appertains to this chair. The lectures will be amply illustrated by specimens, models and diagrams, and the practical application will be given in the Laboratory, under the supervision of an accomplished Mechanical Dentist.

DENTAL PATHOLOGY AND THERAPEUTICS.

The lectures delivered from this chair will embrace General Pathology, Dental Pathology, the Pathological Relations of the Teeth to other parts of the System, together with a minute description of all special diseases that have any relation to Dental Surgery, or of interest to the Dentist. They will also include a careful examination of therapeutic agents and their general application. Their indication in the medical and surgical treatment of diseases of the mouth, both idiopathic and symptomatic, will be fully illustrated. Special attention will be directed to the application of all the Anæsthetic Agents.

ANATOMY AND SURGERY.

The instruction in this department will embrace a plain and comprehensive view of the structure of the human body. The lectures and the demonstrations will be given over *the dead body dissected for the express purpose* of elucidating the subject. With the same object, vivisections on the lower animals, while under the influence of an Anæsthetic Agent, will be employed. Such description of the comparative anatomy, microscopical structure and connections of the teeth, as their importance may demand, will be fully given. The valuable and extensive collections of Anatomical Preparations of the incumbent of this chair, consisting of wet and dried specimens, papier mache manikins, models in wood, and accurate French plates, will enable him to illustrate his course of lectures very clearly.

In addition to the above course, a Surgical Clinic will be held by Doctor Forbes during every week, for the purpose of performing such operations in oral and general Surgery as may be deemed advisable to advance the student in this particular branch of knowledge. The cases will be selected from a dispensary which the Faculty have established.

DENTAL HISTOLOGY AND OPERATIVE DENTISTRY.

The lectures of this department will embrace the comparative anatomy of the teeth, the functions and microscopical pecularities of the dental organs, the development of teeth and their component tissues. It will also include a full description of the materials and instruments used in operative dentistry, and will comprise a thorough elucidation of all the operations required of the Dental Practitioner, such as filling, extracting, regulating, &c. &c. A portion of the course will be devoted to a description of the microscope and the modes of preparing specimens. The incumbent of this chair will practically demonstrate in the clinic the theories taught.

CLINICAL INSTRUCTIONS.

In addition to the above, with the exception of Saturday, four hours are aily spent by the student in actual practice under the supervision of the emonstrators.

In the Operative Department.—To afford every facility to the student to acquire a thorough practical knowledge of this branch, the operating rooms are furnished with twenty-eight chairs, so arranged as to command the best light, and all the appliances for comfort and use. To these chairs the students are assigned in classes, and certain hours are fixed for each member of the class to operate. Every student is required to provide his own instruments, except those for extracting. He is expected to keep them in perfect order, and will be provided with a place in which they can be locked when not in use.

In the Mechanical Department.—In the Laboratory are all the conveniences for the preparation of the metals, manufacture of teeth, single and block, mounting, &c. Every process known in the profession, which has any value to the mechanical dentist, is fully taught, and receipts of valuable compounds are freely imparted; and the student is required to go through all the necessary manipulations connected with the insertion of artificial teeth—from taking the impression of the mouth to the entire construction of the denture, and its proper adjustment in the mouth of the patient. Every student is required to furnish his own bench tools, and will be provided with a drawer which he can lock.

Practical Anatomy.—The great facilities for the study of practical anatomy to be found in Philadelphia, in several well ordered and supplied dissecting rooms, present to the student advantages for its prosecution superior to those offered in any other city.

Hospital Clinics.—In addition to the facilities afforded by the College for a thorough course of instruction in the theory and practice of dentistry, the celebrated hospitals and clinics of the city constantly enable the students to witness various important surgical operations which are highly interesting and instructive. The medical and surgical clinics of the Pennsylvania and Philadelphia Hospitals, two of the largest eleemosynary establishments in the world, are open to medical and dental students, free of charge.

FEES.

Matriculation, (paid but once,) - - - - - - - - - -	$5 00
For the Course, (Demonstrator's ticket included,) - - - - -	100 00
Diploma, - - - - - - - - - - - - - - -	30 00

TEXT BOOKS AND WORKS OF REFERENCE.

Leidy's or Gray's Anatomy; Carpenter's or Kirk's Physiology; United States Dispensatory; Pereira's, Biddle's or Stille's Therapeutics; Fownes' Elements of Chemistry; Regnault's Chemistry; Lehmann's Physiological Chemistry; Hartshorne's Principles and Practice of Medicine; Wood's Practice; Tomes' Dental Physiology and Surgery; Harris' Principles and Practice; Taft's Operative Dentistry; Richardson's Mechanical Dentistry; Wildman's Instructions in Vulcanite Work; Barker on Nitrous Oxide; Gross' or Erichsen's System of Surgery; Paget's Surgical Pathology, or other standard works on the subject.

QUALIFICATIONS FOR GRADUATION.

The candidate must be twenty-one years of age. He must have studied under a private preceptor at least two years, including his course of instruction at the College. Attendance on two full courses of lectures in this institution will be required, but satisfactory evidence of having attended one full course of lectures in any respectable dental or medical school, will be considered equivalent to the first course of lectures in this College. Also satisfactory evidence of having been in practice five years, inclusive of term of pupilage, will be considered equivalent to the first course of lectures.

The candidate for graduation must prepare a thesis upon some subject connected with the theory or practice of dentistry. He must treat thoroughly some patient requiring all the usual dental operations, and bring such patient before

the Professor of Operative Dentistry. He must, also, take up at least one artificial case, and after it is completed, bring his patient before the Professor of Mechanical Dentistry. He must, also, prepare a specimen case to be deposited in the College collection. The operations must be performed, and the work in the artificial cases done at the College building. He must also undergo an examination by the Faculty, when, if found qualified, he shall be recommended to the Board of Trustees: and, if approved by them, shall receive the degree of Doctor of Dental Surgery.

CANDIDATES FOR GRADUATION WHO HAVE NOT ATTENDED LECTURES.—Dentists who have been in continued practice since 1852, are eligible to be candidates for graduation without attendance on lectures. The candidate for graduation must present satisfactory evidence of his having been in practice for the allotted time, also of his good standing in the profession. He must prepare a thesis upon some subject connected with the theory or practice of dentistry. He must present specimens of his workmanship. He must undergo a satisfactory examination by the Faculty, on each of the branches taught by them; when, if qualified, he shall be recommended to the Board of Trustees, and if approved, shall receive the degree of Doctor of Dental Surgery. Of this class of graduates, the matriculation and diploma fees only are required.

For further information, address

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BOARD can be obtained at from $4.00 to $8.00 per week.

ALL THE INSTRUMENTS AND TOOLS required can be procured for from $15.00 to $20.00.

THE

DENTAL TIMES.

VOL. VII. PHILADELPHIA, JANUARY, 1870. No. 3.

Original.

SALIVARY CALCULUS.

BY C. E. FRANCIS, D. D. S.

[Extracts from a paper read before the First District Dental Society, of New York.]

This term is applied to a limy incrustation found attached to the teeth, usually around their necks, but sometimes investing their entire crowns. The salivary glands, like many other glands in the animal system, secrete atoms of lime.

The ducts which convey the saliva into the mouth, carry alse their calcareous solutions, which become precipitated, and find lodgment about the teeth where they collect and harden. This concrete matter once fairly attached to a tooth or teeth induces a rapid accumulation of this offensive substance. The broader the bed thus formed, the greater is the inducement for increased deposits.

The inferior incisors, from their peculiar position, are usually the first teeth upon which it collects. The sub-lingual ducts pour their currents against the lingual surfaces of these teeth, and, indeed, they are always submerged in the buccal fluids flowing from all the ducts which empty their contents into the mouth, and which, by the law of gravitation, are invited into the basin beneath the tongue.

The superior molars are next in order of the teeth thus invested; the limy sediment finding its way to their bucco-cervical margins, where oftentimes it collects in large quantities. This may be attributed in part to their close proximity with the ducts of steno, but it seems more reasonable to believe that these surfaces of the molars are so covered by the folds of the cheek that they escape disturbance in masticating, or from the searching efforts of the tooth brush.

Chemical analysis shows that salivary calculus is a combination of lime, salts and animal matter; the ratio of lime depending upon the degree of density in the collection found. The results of analysis differ in different

specimens produced. When very hard it may yield 70 or 80 per cent. of lime. Specimens as analyzed have averaged to 100 parts—about 60 parts phos. of lime, 15 of carb. of lime, 15 to 20 of animal matter and mucus. I have never seen two tables present the same results, so difficult is it to find two specimens of the same density.

The mischief caused by the presence of salivary calculus upon the organs of mastication is almost wholly of a mechanical nature. When suffered to collect in any quantity it causes irritation to the mucous membrane with which it comes in contact. It destroys its connection with the teeth, fairly forcing its way down to the alveolar borders, which upon exposure become absorbed, and the teeth finally loosen and fall out.

I have seen teeth completely incrusted with this calcareous deposit, and have removed large cakes one-sixteenth or one-eighth of an inch in thickness. Often we find the inferior incisors all cemented together so firmly that it seems unsafe to disturb them, on the principal that, by "Union they stand, and if divided they fall." Aside from the mischief produced by the presence of this treacherous deposit, it gives the teeth an unpleasant, aye, a disgusting appearance, suggesting filthiness of person. It contaminates the breath, vitiates the buccal fluids, and hastens the ravages of time upon the whole animal economy.

Common as the cases where it exists, it never need accumulate, and is the result of untidy habits or a neglect to keep the teeth properly cleansed. When it is newly deposited and of a cream-like consistence, it may easily be removed by the skillful use of the tooth brush and some simple dentifrice; but, after it hardens, it can be detached only by steel instruments. There is, however, no necessity for allowing it to accumulate, which, I repeat, is only the result of carelessness.

I find that few persons are willing to admit all this, but frequently attribute the loss of their staggering masticators to medicines which they have swallowed in the course of their lives, and the much abused preparations of "mercury" come in for their share of abuse. "Oh! mercy, what a host of sins are hurled at your metallic head." "If a hundredth part of them are veritable, what a terrible curse you have been to humanity." It seems to be a comforting peculiarity of mankind to shift their burden of sins upon the shoulders of others. Physicians are very good pack-horses on such occasions.

Concrete salivary calculus may be removed by means of instruments made for that especial purpose. They should be of well-tempered steel, of various patterns and sizes, suited to the conditions and positions of the deposits and shape of teeth. Care should be taken to avoid scratching or fracturing the enamel during the process of scaling. After detaching all the particles possible with scrapers, the newly disclosed surfaces may

be rubbed with well-shaped points of "Superior stone," and polished with wedge-shaped sticks of wood loaded with finely ground pumice, soap and prepared chalk.

I have, so far, avoided using the term "tartar," which I consider a misnomer, when applied to salivary calculus; but there is another kind of deposit found upon the teeth, which may more properly be called by that name, in absence of one more appropriate. I refer to the dirty-green or brown stain, so provokingly common in these degenerate times. It usually collects upon the labial surfaces of the incisors and canine teeth, where it stamps a repulsive looking crescent upon each ivory tablet, or completely envelops all the teeth with a dusky veil, forcibly reminding the beholder of an array of miniature tomb-stones covered with mould. This is evidently a secretion from the mucous membrane, exuding from the minute follicles or crypts around the necks of the teeth. After collecting upon the teeth it soon undergoes decomposition, and generates an acid which produces chemical erosion upon the surface of the enamel, frequently eating through to the very substance of the dentine.

The teeth of young persons are particularly liable to be clouded with this slimy deposit, requiring the utmost care to prevent its insinuating and treacherous attachment to their pearly dentures. It is sometimes quite difficult to remove the discoloration thus formed, so deeply has it been instilled into the rods of enamel. It should, nevertheless, be thoroughly cleared away, scraping it off with sharp, keen instruments if necessary. The disturbed surfaces must be smoothly polished, for if left rough they will soon gather another coat of green. Our patients who present such neglected teeth should receive a lecture. They need much lecturing, and oftentimes some scolding. It is the business of the dentist to explain the absolute necessity of keeping the dental organs perfectly free from all extraneous collections, and to instruct them how it may best be done.

New York City.

PROFESSIONAL QUACKERY.

BY SAMUEL WELCHENS, D. D. S.

In locating this term and settling its import and real significance, a wider range of observation should be entertained than is usually devoted to it. It is sometimes applied to the pretensions of individuals through personal or other prejudices, when, perhaps, its true object would be found in the assailant, rather than the one at whom the blow was aimed.

The term quackery is generally applied to false pretensions in the healing art. Dentistry being a branch of this science, it applies as aptly to a bungling operator in that profession as in the medical profession.

But we apprehend that no such limit should be given to a term which expresses so well a meagreness of qualification in any professional pursuit.

Quack teachers, quack statesmen, quack lawyers, and even quack scholars meet us plentifully in every direction, and why not quack dentists, in a profession so easy of access? If a self-styled physician, who has no knowledge of the human system, undertakes to cure all diseases by a sovereign panacea, which is known to himself alone, he is a quack by universal concession.

If a self-styled dentist, though scarcely able to classify the teeth, professes to practice in a profession which treats one of the finest organic structures of the human body, and proves himself a novice and bungler, he should not only be exposed as a quack, but legal enactment, with severe penalties, should be demanded as a protection to the people, as well as to the worthy practitioner in that profession.

Quackery, then, we conceive to consist in a false show of professional ability, or pretension to a virtue or power which is not possessed in fact.

With this definition of the term it will be seen, that failing to meet or reach a proper standard of excellence is not the only touch-stone of professional integrity; but an individual securely planted upon a scientific basis, can justly incur the odium of the term *quack*, by over-reaching, as it were, the limit of his perception and qualification.

Thus, if a given branch of any science is pursued as a specialty, without a proper consideration of relative conditions as balancing elements in the totality of knowledge necessary to proficiency as a skillful devotee of such science, the theme is often run into a ridiculous extreme, and the individual becomes a monomaniac upon the subject. In this way men of the highest culture frequently lose the influence they might exert, by maintaining conclusions not warranted by the facts in the case.

We find this speculative tendency in every profession, and much of it in the pursuit of every branch of science. We would not disparage a spirit of research and earnest inquiry, but the extremes into which minds that are too active are sometimes carried, not only defeats the ends of most brilliant and useful scientific triumphs, but they expose themselves to the ban of the term under consideration.

This kind of quackery is fraught with more mischief than that which marks its footsteps upon every stroke of the instrument, or every feeble sentiment of the mind of an inefficient and bungling operator. It goes abroad into a profession with a certain degree of authority, as being the well digested opinion of those who stand at the very head and front of such profession, and thus, hand in hand, those two extreme representations of the common idea of quackery work out their destiny without the slightest consciousness of their close proximity.

In the profession of dentistry, with its loose code of ethics and easy principles of jurisprudence, any man of ordinary intelligence, with but a smattering of technicalities, and a small stock of mechanical ingenuity, can manage to get a practice, and, through the instrumentality of friends, maintain even a respectable position as a practitioner.

This is done frequently through a species of bombastic advertising, in which everything skillful, scientific and artistic is promised, with no more qualification to back up such pretensions, than they have brains to understand the responsibilities of the profession. Thus some of the unsophisticated are drawn into the meshes of this nicely woven net-work of quackery, to be promised this or that operation free of charge, if they send custom, or influence their friends to patronize and encourage the machine. There is here a support to quackery, through a species of advertising that cannot be met or overcome by any other instrumentality than the strong arm of the law, which would render inefficiency in dentristry amenable, just as the physician, the druggist, or the lawyer is, for mal-practice.

Not content with the measure of mischief they inflict upon a community, where they may hold the sway of "squatter sovereignty" for a season, these "*things*" who arrogate to themselves the appellation of *dentist*, move about from place to place—*itinerate*—grace certain localities with their presence, with a view of benefiting such communities with a dispensation of their superior skill; condescend even to visit houses, so that the dear people be not allowed to suffer too long with maladies which they alone can cure, or munch their food for the want of artificial dentures, such as they "*alone can supply;*" or, we might add, sustain a species of robbery out of natural teeth and money both, *such precisely as they alone can perpetrate.* Now, there is no calculating the amount of just such quackery as this in every community. It steps abroad with the air and strides of a monarch, and what is not made up of unvarnished humbuggery is accomplished by a species of *consummate impudence.*

That this kind of practice should be supported by any class of people is a question beyond our comprehension. How it is that the natural bias of the public mind has a gravitating tendency to deception and humbuggery, rather than a proper appreciation of the noble and scientific, is very hard to explain; but the most perplexing and incomprehensible idea connected with the whole affair is, that so flagrant a species of quackery as that we have just adverted to, should have countenance and support from the great scientific heart of the profession itself.

Publications in the interest of the profession, issued by men of decided talent, and marked skill and ability as practitioners, have not only thrown cold water upon efforts to rid the profession of those mountebanks, but

they actually use sweeping and unwarranted assertions calculated to thwart such efforts to obtain legislation, whereby some headway might be made against this tide of "*professional quackery.*" Not only this, but societies organized for the express purpose of mutual benefit in the theory and practice of dentistry, and the cultivation of closer and more genial social relations are, in turn, discouraged and denounced by them. Might this *veiled palpable defence* of all the corruptions of one of the liberal professions not be regarded as the *very essence of quackery?*

But our strictures upon this subject are not to be confined to those who do not meet in a scientific way the exactions of our art; professional delinquencies and indiscretions in high places come within the sphere of our theme, and must be noticed accordingly. We have no disposition to disparage the inventive talent within our borders, but it very frequently creates an interest upon given subjects, which drives us into straits as practitioners, that lays us right open to the charge of quackery. Here, of course, we resent the adversion, but charge back directly upon those whose high position and earnest recommendations forced the adoption of the article before it could be properly compared and tested by scientific analysis. There is no calculating the amount of trouble the profession has with just such points of difficulty, and it is hard to divest the mind of the idea that that man, however high he may stand in the opinion of others, is a *quack*, if he lends his name or influence indiscriminately to the promotion of a patent article or nostrum which is capable of a false representation, or which may become a burden to his profession.

It is not alone, however, in such recommendations, that many of our substantial men lay themselves open to censure. The extremes to which they are frequently led, in giving opinions upon new steps of advancement in regard to the causes of pathological conditions and therapeutical treatment, make them appear most ridiculous to the sober and thoughtful portion of the profession.

We are always mindful of the power some men have of grasping ideas and suggestions almost intuitively, and the vast advantage their mechanical ingenuity gives them in their manipulations. There is here that peculiar force of character and perception which will at once bring forward talents and genius which leads off in the process of development; but when well.settled principles in our profession are set aside by the assertion that the man is "weak or wicked," or "a sinner," if he observes them, we are tempted to regard that man as a *quack*, however high he may stand in the estimation of himself or his friends. He is emphatically overreaching his own powers of perception, and overlooking the anomaly of his position, when he censures others for doing with an active agent what he himself practices by less potential means. He thus professes to have

the ability to do that which others fail to do, and by virtue of this false show of professional skill, makes "pretensions to an inward virtue or power which is not possessed in fact."

We are not charging quackery upon any individual—we are simply drawing parallels and setting up mirrors, and if any see themselves reflected therein, it is to be hoped that some good may come of it, not only to themselves, but to the profession also. We believe in societies. We think that development by association is to be the future safeguard of our profession; but it must be apparent to the most casual observer that the amazing amount of quackery which is everywhere practiced in dentistry must be eradicated, and that this can only be done with the aid of the *strong arm of the law.*

We have, as a profession, exhausted our efforts to educate the public mind up to an appreciative scientific standard. We have tried the selfish individual plan of every man "going it alone." An harmonious oneness must pervade the entire reliable mass of the profession, if we would divest ourselves of the odium those mountebanks cast upon us, or that which we ourselves may incur by the support we might give it in taking sides against well-directed efforts to obtain legislation upon the subject, or by assuming an inferior omniscient air in our movements as practitioners.

LANCASTER, PA.

"REVIEW."

BY T. L. BUCKINGHAM, D. D. S.

A contributor, who signs himself M. D., in the November number of the *Dental Register*, makes some very pertinent criticisms on the published proceedings of the American Dental Association. But we think in some of his points he is in error, and the object of this article will be to point out some of those errors.

He says: "The American Dental Association is considered in the light of a Supreme Court of Dentistry, in which are tried, by the most rigid scrutiny, all new theories advanced, and all new methods of practice are by it thoroughly investigated, rejecting of the former such as are not supported by facts, and accurately weighing the merits of the latter by the statistics of success and failure. * * * Therefore, while its opinions are entitled to great weight, they are also legitimately open to criticism. From the manner in which the business of the association is conducted, it must be held responsible for every proposition introduced that is received without objection, no matter how erroneous the same may be."

The writer has overlooked the disclaimer that is printed in all the official published proceedings of the association: "The American Dental Association, although formally accepting and publishing the reports of the various standing committees and essays read before the association, holds itself wholly irresponsible for the opinions, theories or criticisms therein contained, except when so decided by special resolution."

It will be seen, by the above, that the association is not responsible for the articles read nor the language used in debate; all the members who attend and take part are not always thoroughly acquainted with the technical terms that should be used. The substance mentioned in the discussion was called by one of the members hydrochlorate of zinc instead of the oxy-chloride of zinc; the object was to ascertain its properties as a capping for nerves and as a temporary filling. The subject was very interesting to most of the members, as they wanted to know the best manner of using it and the success attending its use. To have stopped the speaker then to correct the term would have changed the subject and broke the thread of the discourse; and we doubt very much whether the association would have tolerated such an interruption; and after the debate was over the error was not thought to be of sufficient importance to bring it up, in fact, it was forgotten until it was seen in print, and then, like other errors, was allowed to pass. But our friend has thought it of sufficient importance to make it the subject for the article referred to.

He also says: "There were some very pointed remarks made by an eminent member as to the wonderful ignorance of mankind at large on the subject of chemistry. I do not think that he meant to include himself and fellow-members in that comprehensive term, 'mankind at large;' but their remissness in letting a statement in opposition to generally accepted facts pass unnoticed is open to two explanations, which any person may make for himself."

Now we propose to show that the old adage is correct, "that those who live in glass houses should be careful how they throw stones." When a reviewer attempts to correct an error he should be careful to be correct himself. Let us now examine his explanations and illustrations, and we will italicise the words we want to call attention to.

"Oxy-chloride of zinc is a compound occasionally used for filling teeth, and is made by adding to an oxide of zinc *hydrochloric acid which has been saturated with zinc.*" And further on he says: "This *acid* will not unite with zinc in any form without being decomposed." Then if it is decomposed it is not hydrochloric acid. This error is hardly worth taking notice of.

At the commencement of the next paragraph he writes: "It is a fact in chemistry, that all acids, when not themselves decomposed, *unite only with the oxides of their several bases.*" Now, we know what an oxide is, and many of the oxides are bases, but the oxide of a base is a new term in chemistry. But we will let that pass, as it is not a very grave error. In the next sentence he gives us the composition of some chemical compounds, and makes "use of symbols which all persons at all acquainted with chemistry will understand." Sulphate of soda is written SO_3NaO. Now, it is a rule in writing chemical formulæ to put the electro-positive element or compound first. According to this rule, it should have been written, $NaO\ SO_3$, and it will be found so in all works on chemistry; and yet, through all his article, he has written the electro-negative compound first. In the next illustration he has made a greater error or he has made a discovery; after giving us the action of hydrochloric acid on zinc, which is correct, except in writing, he has reversed the symbols. He says: "But the same decomposition of the acid takes place when the *oxyd* of zinc is used as a base. $HCl+ZnO=ClZnO+H$." Now, can he form the oxy-chloride of zinc by acting on the oxide of zinc with hydrochloric acid? Does chlorine combine directly with the oxide of zinc? Our impression has been that chlorine combined first with the zinc to form chloride of zinc, and that combined with the oxide to form the oxy-chloride; and we think that this is his idea of the composition, for he says, at the close of his article, "as only chloride of zinc is left to unite with the oxyd of zinc it cannot correctly be called a chlorate;" and if we pass on to the next formulæ he gives us, we may see that he has committed another error. The symbols for hydrochlorate of ammonia he gives are, $HCl+AmO=HClAmO$. Now, Am is not properly a chemical formula, although it is used in some of the books. But we suppose he intends it to represent ammonia, or NH_3. If he will refer to the books he will find that hydrochlorate of ammonia, muriate of ammonia, sal ammoniac, or chloride of ammonium, (for it goes by all these names,) is composed of $AmHCl$, or NH_3HCl, or by the more recent formula, NH_4Cl, and there is not an atom of oxygen in it. There are other errors in the article, but it is not necessary to pursue the subject further. Our object was not so much to criticise the article referred to, but to direct the attention of readers to the science of chemistry. Many complain because they are not able to read chemical books with the same satisfaction they can books on other subjects, and the difficulty arises from not understanding the nomenclature. When a few pages of these works are studied we have the key to the science, and we can understand, by a correctly written chemical formula, the composition of a compound much better than we could if it were written out in the most extensive form.

FUNGOUS GROWTH—PERIODONTITIS.

BY J. FRED. BABCOCK, BANGOR, MAINE.

Early last spring a case of morbid growth, in the mouth of a lady, was presented to me for treatment, which, upon examination, I found to consist of a large amount of fungous gum situated in the superior jaw, where it was so extensive as to cover the whole of the buccal (as applied to teeth) and labial surfaces of the gums; the teeth were absent in the superior jaw, and the teeth and gums were perfectly healthy in the inferior maxillary. The appearance of the fungous growth, when the upper lip was raised, was that of a double lip, of structure thick and dense, having the same appearance that it might be supposed to possess had the artificial plate, which she had been wearing, been constructed sufficiently large to inclose a portion of the upper lip and cheek on its inner surface. Upon inquiry, she informed me that it had been accumulating for the past three years, the length of time she had been wearing her artificial set; but for some time previous to calling upon me she had been obliged to discard them entirely, because that the growth, so to speak, had crowded them out, and she now desired to have her mouth restored to its normal condition *without* the aid of the knife. Seeking for the cause of this morbid production, I was shown a set of teeth attached to a silver plate, and in this plate it was instantly evident that I had found the object of my search; for that portion lapping over the alveolar ridge on the labial and buccal surfaces had been constructed extravagantly high, and with its sharp, blade-like edge, had cut deep into the lip and cheek, causing congestion and inflammation of the circulatory vessels, followed by effusions which, subsequently organizing, formed the morbid production mentioned.

Upon consultation (by letter, in which I fully described the case) with Prof. George T. Barker, of Philadelphia, as to the probabilities of success in attempting to absorb so large an amount of tissue with the officinal tincture of iodine, he advised me to try an etherial tincture, the formula for which may be found in an article written by him, entitled "Uses of Iodine Preparations in Dentistry," and published in the May number, 1869, of the "DENTAL COSMOS." I acted upon this advice, and at the end of two months, after having, with a camel's-hair pencil, freely painted the parts twice each day, (carefully drying and protecting the healthy tissue with bibulous paper each time,) it was reduced to nearly one-third of its original proportions. About this time some of the characteristic symptoms of iodism (which follows the long continued application of iodine,) becoming apparent, viz: nausea, irritation of the lining membrane of the trachea, causing a hacking cough and restlessness at night, I judged that these symptoms had perhaps been hastened by the inhalation of the

ether vapor, surcharged as it was with iodine, and for some two weeks I abandoned it for a saturated solution of iodine and creasote, but this had no effect whatever in further reducing the growth, and meanwhile the disagreeable symptoms, before mentioned, having entirely disappeared, I returned to the etherial tincture and without any further impediment, another four weeks found it almost entirely reduced, with the exception of one or two still hanging portions near the condyles of the jaw where the medicine had not been applied, because of the great difficulty in reaching them properly; these were excised with a sharp pair of surgeons' scissors, and in another week I had made her a new set of teeth upon a rubber plate, which I was recently pleased to learn had given entire satisfaction, and upon examination of her mouth could find no trace whatever of that which, but a few months before, had made her face so unsightly and thoroughly unnatural.

Case Second.—A lady called at my office, during the past summer, very anxious to have me go and see her sister, who, she informed me, had been confined to her bed for the past four days, suffering with an exceedingly severe toothache. This was upon Friday forenoon, and upon inquiry I learned from this lady that her sister had experienced the first attack upon the previous Tuesday. On the following day she was taken to a dentist for the purpose of having the operation of extraction performed. He, however, said he could not find any apparent cause for the pain; but, probably acting upon the principle that, "nothing venture, nothing gain," he proceeded to extract the second bicuspid tooth, which had been previously filled with amalgam, but which, since the operation of filling, over a year before, had given her no pain. Owing to the loss of blood consequent upon the operation of extraction, she experienced complete relief for about an hour, when the pain again returned even more severely than before, and she again had recourse to this dentist, who, upon responding to her call, informed her that he could only afford relief through the extraction of all of her upper teeth. To this proposition she would not consent, when he endeavored to quiet her with chloroform, and also with morphine, but without success. At this stage I was called in, and upon reaching her bedside found her very pale, her left eye very badly inflamed, and already much emaciated with the intensity of her sufferings for the past three days. She was moaning piteously, and with an occasional shriek, as a spasm of pain would traverse the nerves in the side of her face, would beg to be relieved from her misery. For ninety-six hours she had not obtained sleep, and could only secure temporary relief through taking ice water into the mouth and instantly spitting it out again, then immediately repeating the operation. This she was obliged to do so often, that in the course of twenty-four

hours she would, in emptying the water from her mouth, fill an ordinary wash bowl some five or six times; in fact, so often was she obliged to sip the water that it was with the greatest difficulty that I could make an examination of her teeth; but, after some perseverance, I partially succeeded, and upon concussion with an instrument I found four teeth, the periosteum upon the roots of which were highly inflamed, viz: the canine, first bicuspid, and the first and second molars, (the second bicuspid gone,) all upon the left side of the median line. These teeth, with the exception of the canine, which was filled with gold, were filled with amalgam. I endeavored to make local treatment, but found it to be utterly impracticable, owing to the fact that the constant severity of the pain made it imperative that she should have the ice water in her mouth continually. Finding it impossible to resort to the usual measures, I gave her a teaspoonful of the following prescription:

℞.—Quinine, sulph., ʒss;
Acid, sulph. aro., ʒij;
Elix. calisaya bark, ℥xiv.—*Mix.*

When almost instantly the pain ceased, and for some three minutes she experienced entire relief; whereas, before it had been *unremitting*. At the end of this time it returned, but with abated force, and before I left her, which was in the course of an hour, the paroxysms were very much less frequent, (this was at 12 o'clock, M.) I left the medicine, with orders that the dose be repeated at 2 o'clock, P. M., and upon returning, at 3 o'clock, I found her comparatively comfortable, but having an occasional twinge of pain about once every fifteen minutes. The water had been entirely discarded, and her gratitude to me for what relief I had afforded was very marked. Morphine powders were left for her to take, and upon calling the next day I found that she had slept soundly, and since the night before had had scarcely any pain. I now made a more satisfactory examination; the teeth were still quite sore, and no reason was found to change my previous diagnosis. Upon the day following she was brought to my office, when I applied three leeches to the gum, distributed directly over the teeth affected, and made a free application into the wounds of tinct. of capsicum; this treatment was again repeated in about six hours, only that, instead of leeching, the lance was used freely. It was repeated the following day, when I pronounced my patient cured; for all pain had ceased, and the teeth were not more than ordinarily sensitive to the quite heavy concussion of the large end of a plugger. This was six months ago, and quite recently I have learned, by personal inquiry, that the lady has not been afflicted since. It only remains for me to add that I could not trace this inflammation of the peridental membrane to any apparent cause; but it was probably the result of a very severe cold which she had but recently acquired.

OXYCHLORIDE OF ZINC AS A CAPPING.

BY J. S. SMITH, D. D. S.

. Since reading the report of Dr. Salmon, of Boston, (which, by the way, I find to be very instructive,) upon the subject of the application of oxychloride of zinc to exposed pulps; and, also, an article written by Dr. James Truman, DENTAL TIMES, Vol. VI., July, 1868, I have been experimenting, to some extent, with this agent, as a capping, with varied success. I might say of all cases treated in this way by me, two-thirds of the number have been successful so far, to the best of my knowledge. The failures may be attributed to the lack of sufficient patience upon the part of the patient, through a dread of again being compelled to have the case treated, or the tooth removed.

The pulp, and the parts about the tooth or teeth, should be in a healthy condition before capping. In my judgment a bleeding pulp should be gently syringed with tepid water, and the hemorrhage should subside prior to the application of the cap, else the coagulated blood would increase the bulk under the filling and upon the pulp, causing undue pressure upon that organ; consequently, pain follows, and a probable necessity to destroy its vitality. The pain, however, may subside for a time from pressure, which of itself, in many instances, would not be sufficient to endanger the vitality of the pulp; but the gas that may be generated from the coagulated body may set up an irritation in time. Thus, the pulp may be said to be in danger from both; pressure upon the one hand, causing inflammation and suppuration, and gas generated, causing irritation and finally abscess.

This, I am aware, is but theorizing on my part. If I have strayed into error, I await patiently for some one interested to let his light shine through the medium of this Journal for the benefit of those who are laboring in the same common cause. "It is certainly desirable always to save a part where it is possible so to do," says an eminent operative dentist and professor. Oh, if the profession had more of that mind and ambition of making efforts to investigate that we may learn to save, as well as destroy, the organs that are entrusted to our care.

The dental surgeon should be as conscientious upon this point as the general surgeon is supposed to be in saving the arm or the leg when diseased.

The further we can advance in the healing art of dentistry, the higher we are elevated as scientific men. And I trust the day is not very far distant when the profession, or the specialty of *dentistry*, will stand shoulder to shoulder with general medicine, and other specialties, and be respected as such by the world.

COLUMBIA, PENNA.

CASE OF SECONDARY OSSIFIC DEPOSITION IN A TOOTH.

BY S. P. CUTLER, M. D., D. D. S.

A lady about forty-eight years of age, rather stout, generally healthy, and of a lymphatic, nervous temperament, some tendency to the sanguine, presented herself for dental treatment. Her teeth had from early childhood been defective, and for the past ten years she had been wearing a gold plate clasped to two molars, resting upon the roots of the incisor teeth, which had been filled. The left central incisor had been intact, except that some twenty years ago it had been filled on both approximal surfaces with gold, and upon its lingual surface, at a later date, with os-artificial, which had failed to preserve the tooth. A few days before presenting herself this tooth was fractured in a line with the three cavities of decay. On examination, the remaining portion was found quite sound and firm, and I excised and filed the tooth to the gum before reaching any sensitive point; there the pain became very severe, but still there was no exposure of pulp cavity. After filling the cavity in the root sufficiently, a tooth was added to the gold plate, which rested on this stump. The operation being satisfactory, she departed, but in a few days returned, and stated that the root last treated was sensitive to sweets, acids and cold water, also to the pressure of the plate in mastication. I applied nitrate of silver to the exposed bony portion of the root, which gave momentary pain, soon subsiding. The point to which I wish to direct attention is this, the left central incisor ossified in the crown, and in the neck some distance above where I filed, the ossification being complete, uniform and homogeneous, though with a magnifier was unable to determine the original outlines of the pulp cavity, which can generally be done, the secondary bone being distinctly marked, this case forming an exception to this rule.

We often see teeth calcify inward from wearing away by mastication and other causes, which, however, are more rarely met with. This case, though not having caused any trouble, must be regarded as pathological, not physiological, though a saving proviso in this case as in abraded teeth. There must have been sufficient irritation by the presence of the plate on adjoining stumps, and the amount of decay and filling, to have induced the calcification. Whether or not the pulp itself first became nodular, and then ossification of the inner walls took place as a secondary process, I cannot determine, having no data to go upon. If nodulation took place at all, it certainly must have been in the fang portion, entirely above the point filed, otherwise there would not have been the same homogenity in the adventitious process. I had before many times found crowns of decayed teeth, where removed for the purpose of inserting pivot teeth, more or less calcified, but none so high up the neck. In some instances

it is found very near to the gums, but have not, in years past, paid the same attention to such phenomena as more recently. Here, then, is a new field of research that will help out our brethren from former ignorance of the subject to more definite and refined knowledge in this new and comparatively untrodden pathway to special and important knowledge. That nature does make these efforts, in rare instances, to save herself from ruin, there can be now no longer any doubt on the subject. That this is also a provision that nature makes to save her tooth we may readily infer; still, on the other hand, this might be regarded as an exception to her wonted rule, and not the rule itself.

I recently prepared a specimen from a tooth that had both nodular and calcified pulp walls, a lower molar, the greatest amount of secondary deposit being at the neck region, immediately over the bifurcation, making one of the most interesting specimens for the microscope I have ever seen, fully establishing my former views on the subject of dental anatomy, especially histologically.

We want further researches into dental phenomena; then let every one in the profession contribute but his share, and we will soon be far in advance of our present stand-point of dental knowledge and usefulness, commanding more respect from our more proud *padre, medicine.*

As to how long the root above spoken of may retain its vitality by its living pulp it is impossible to determine, as we have no data to predicate from, there being a want of published observations on the subject.

This root may or may not continue to calcify and retain vitality; the chances are favorable, at least, for an indefinite vital continuance. The falling down of the fang, thereby cutting off and curtailing the extent of tubular structure, may and doubtless will shorten its vital existence by narrowing down and circumscribing its boundaries. I intend watching closely the result of the above cited case.

HOLLY SPRINGS, MISS.

DISPLACEMENT OF A TOOTH GERM BY A BLOW.

BY M. MILNOR WORRALL.

Miss D—, a maiden lady, about forty-five or fifty years of age, came to my preceptor's office about the middle of October, complaining of a soreness at the roof of her mouth.

She was wearing at the time a full upper set of artificial teeth on vulcanite, which, upon being taken out of the mouth, showed quite a discoloration on the palatine surface. Upon examination of the mouth, there was to be seen on the palate, a little to the right of the median line, what appeared to be a piece of bone about the size of a pin-head.

My preceptor, after a careful examination with an excavator, asked her if she had ever had an accident occur to her teeth in childhood. The answer was in the affirmative, viz: That, when about seven or eight years old, she had a fall down stairs, by which her upper front teeth (superior incisors) were knocked out, and that afterward she never had the tooth on the right side, next to the two front ones, (the right, superior lateral incisor.) Upon hearing this, his mind was soon made up that this was the missing tooth, the germ of which had been displaced by the blow on the temporary teeth. He then, with a lance, made two incisions, one at right angles with the other, across the tooth, to see in what position it was lying. He found that, after extending upward a short distance, the root turned upon itself at right angles, the crown pointing toward the posterior portion of the mouth.

After the bleeding had in a measure subsided, gas was administered and the tooth extracted. On examination out of the mouth, it was found that the crown had been absorbed, leaving nothing but the neck and root of the tooth. She was first troubled with pain about six months before, and the pressure of the tooth, upon her artificial plate, had been a constant source of irritation.

West Chester, Pa.

"SUBJECT."

"Doctor, I once had a tooth extracted that was so difficult of removal that the operator actually raised me bodily from the chair, in his efforts to get it out."

The above sentence is doubtless familiar to nearly all dental practitioners, and the thought occurred to me, that had I the brains and power of humorism of a Charles Dickens, what an opportunity would a scene like the above present to the mind of such a genius. The scene of poor Pickwick, waking to consciousness in the pig stye, would fall short in humorousness, if compared to the scene of an operator grasping a tooth with such a degree of firmness and strength as to elevate his patient bodily from the chair.

Just pause for a few moments, and take into consideration the general appearance of such an affair. The patient is suspended, as it were, in mid air, by the grasp of an herculean arm attached to a tooth; as is usual, under such *extraordinary* circumstances, the patient must naturally be suffering excruciating pain, which, in answer, produces great and involuntary contractions of the entire muscular system, thereby presenting to view a similar appearance to that of holding a dancing jack by the head, and pulling the string to make its limbs fly about: now, add to this picture the peculiarities of expression in the face when incited by intense fright,

with hair standing on end, eyes ready to leap from their sockets, mouth distended, and elevated eye-brows, &c , &c., and you will have a scene worthy the notice of any humorist.

My reader, the above little sketch is not altogether mere fancy and fun, but, as the old and well worn adage remarks, "that truth is stranger than fiction," I must concur in its applicability to this subject. When we take a retrospective view of this operation, regarding the positions assumed, and instruments used in extracting teeth, it is not surprising that such scenes have been enacted in actual practice; and I regret to add, even in this enlightened age, does occasionally continue to occur. Indeed, I have personally witnessed some operations by unskillful manipulators that were sufficient to startle the most petrified of human hearts.

But thanks to an all-wise and merciful Providence, we are emerging, as it were, from a period of darkness, ignorance and barbarity, and are being ushered into a land full of promise and humanity. A patient once remarked to me, after an operation, "doctor, this advance in science is perfectly wonderful, and only corroborates my *religious* belief, that in time to come, on *this* earth, we will have done with all physical pains and sufferings." Certainly this is an humane religion, and, as we are subjects of an humane omnipotence, why not entertain such theories?

But I am digressing, and would beg leave to offer a suggestion to practitioners, who have thus ingloriously succeeded in proving the difficult nature of an operation, by the accompanying elevation of their patients to reflect a little while, and employ (providing they do not possess it) a little *common sense*, and take into consideration two or three questions: first, whether it is the difficult nature of the extraction; second, the instruments he is using; or thirdly, the position in which he may stand to his patient, that could be productive of such a result. It appears to me that, with a very few moments of deliberation, he will be able to answer intelligently and emphatically, that it is the instruments employed and the position assumed, and not the natural difficulties attending a severe case of extracting.

Perhaps some of my readers will think a statement had better be made regarding the proper position of the operator, and what sort of instruments, in the author's opinion, are the most desirable in this particular operation. This, he will have to answer, is a matter of fancy, some preferring certain peculiar instruments and positions, and others choosing quite a different form; but his own choice of position is *always* to the right of the patient, and to employ only such instruments as will allow perfect working harmony with this position; this gives the operator the entire control of his left arm to embrace and steady the head while he is manipulating, rendering

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it impossible to move his patient, besides giving additional force and power to his right arm, by its being braced firmly against his breast.

This little publication is not meant for a severe criticism, but to exhibit to such persons who are not familiar with a legitimate "modus operandi," that there are no cases of extracting teeth of so difficult a nature as to justify the sentiment of this article. F. R. T.

ON TAKING IMPRESSIONS FOR OBTURATORS.

BY GEO. T. BARKER, D. D. S.

To obtain an accurate impression of a mouth, in which there exists a cleft or opening through the hard palate alone, or both the hard and soft palate, has ever been considered a difficult operation, one requiring delicacy of manipulation and the display of considerable tact to accomplish a satisfactory result. Congenital clefts of the palate are of four varieties. One, the most common, may be described as a cleft commencing anteriorly near the median line, at the lip, by a division, constituting hare lip, extending through the alveolar walls, and the hard and soft palate.

There is usually but slight separation of the sides, as it passes through the alveolar processes, but the lesion becomes greater as it extends backward through the hard, widening still more in the soft palate. One of the second class may be described as consisting of a cleft, commencing at the base of the alveolar process, extending backward, with loss of substance and gradual separation of sides, through the hard and soft palate.

The third class is characterized by a cleft extending only through the soft palate, generally with considerable loss of substance, and ending abruptly at the hard palate. In some few instances the cleft extends a short distance into the osseous structures of the hard palate.

The fourth class, which is most rare, consists of a simple slit, without any absence of tissue, extending through the velum pendulum palati. This class is well adapted for the operation of staphyloraphy, which may be described as a simple paring of the edges, the parts being held together until united by adhesion, by sutures or ligatures. In the first three classes there is usually more or less deformity of the dental arch, the concavity of the roof of the mouth is greater than usual, and some of the incisor teeth are either absent entirely, or give marked evidence by pitting and abnormal form of impeded nutrition.

In these classes there is usually, on the part of the sufferer, inability to articulate words properly, more or less difficulty in masticating food, and swallowing liquids, which, in spite of efforts to the contrary, will pass into the nares. This is not always the case, for we not unfrequently see

persons suffering with these lesions, even of the first class, who have no difficulty in masticating food or swallowing liquids, they having, by practice, attained the power to close the anterior portion of the cleft by the tongue, which is made to act the part of an obturator. This provision of nature, to overcome the defect of structure, is seen with infants suffering from congenital clefts; for, instead of taking the nipple of the breast between the upper gum and tongue, as ordinary, it is taken between the lower gum and tongue, pressure being made by that organ at the same time it is used to close the cleft. In this way is the operation of nursing performed.

In almost all classes of cases presented for dental treatment, there is usually considerable inability to articulate words with distinctness, those only having nasal sounds being understood by persons whom they are addressing, unless they have, by constant communication, become accustomed to the peculiarities of expression, and can thus guess at their meaning.

On this subject, Mr. Stearns, of London, author of "Treatise on Congenital Fissures of Palate," says: that perforation or fissure of the palate may render the articulation of some of the letters impossible, and, at the same time, vitiate the character of all the others. The indistinctness of utterance is usually proportioned to the extent of the lesion; thus, when the fissure extends as far as the alveolar processes, the patient loses several of the letters, which another, with only a portion of the soft palate involved, is able to produce with considerable distinctness. In cases of fissure, particularly those of the more extensive kind, the movements of the tongue are comparatively limited, as the patient is instinctively aware that the very effort he should make, in order to give letters their appropriate articulation, often serves to render the impediment more painful. So far, indeed, is this inactivity of the organs sometimes persisted in, that speech becomes little else than the emission of a succession of vowel sounds, which, in lieu of receiving proper consonant adjuncts, are only made intelligible by the accompanying inflection, key, gesticulation and expression of countenance, all of which are, more or less, the vehicles of thought. With the limited action of the tongue, nearly all the muscles concerned in the formation of articulate sounds, in a greater or less degree, participate, while the muscles about the nose, as the compressor nasi, depressor nasi, are violently contracted for the purpose of closing the nostrils and preventing the escape of the sound. This gives a particularly unpleasant aspect to the features.

If the velum and uvula be defective or wanting, deglutition is exceedingly difficult, as the aliment matters, instead of passing comfortably along the pharynx, are, to a greater or less degree, forced into the posterior nares.

This is the case whether the lesion be congenital or accidental; sometimes deglutition can only be effected by throwing back the head as far as possible, and casting the food into the pharynx. The inconvenience of incomplete or difficult mastication and deglutition is as serious as that of imperfect speech.

To overcome these defects, and enable speech and mastication to be properly performed, dentists are called upon to furnish some mechanical appliance. I will not, in this communication, speak of the kind of obturators that may be made use of, but will do so in the next number of this journal. Having decided to make an obturator, and believing that the patient can be benefited by one properly manufactured and adjusted, it becomes necessary to obtain a correct impression. To do this, and I will take one of the first class, it has been recommended that the superior portion of the clefts, that is, the parts represented by rudimentary nasal floor and sides, and remaining portions of soft palate, should be obtained by means of sectional plaster impressions. This was exceedingly difficult, and few succeeded in obtaining perfect sectional impressions. It was also requisite that they should be replaced in the superior part of the cleft, their under surface oiled or brushed with a solution of a soap, so as to obtain, while they were in position, an impression of the inferior part of the cleft, as well as an impression of the roof of the mouth and the dental arch. Many, before attempting to take impressions, form impression cups, modeled from rough wax impressions, which, to some extent, facilitate the obtaining of a good impression. A much better method was suggested by Dr. Harroun, of Toledo, who used to obtain an impression of the superior portion of the cleft, a simple piece of gutta percha, cut somewhat of the size of the cavity, to which was attached a piece of watch spring, and covered, (the gutta percha,) above and below, with plaster of Paris. The apparatus was carried well backward into the pharynx; was then brought forwards, behind the rudimentary portions of the soft palate, and, by means of the watch spring, was drawn into position upon the nasal floor, thus obtaining a perfect impression of the cavity. The under surface was then oiled, and an impression taken with a common cup of the roof of the mouth, with the cleft closed by the first impression.

The watch spring was allowed to pass through a hole in the cup at the time of its insertion into the mouth. In many cases the two impressions could be carried backward into the pharynx, and could be removed together; but, by the exercise of a little skill, they could, if necessary, be readily separated. The disadvantages of this apparatus was due to the fact that overhanging portions of the superior impression were apt to be broken from the impression, and their re-adjustment was difficult and

sometimes impossible. Believing that some other substance would accomplish a better result than gutta percha, I have recently used, in the superior cleft, a piece of fine sponge, cut somewhat the shape of the nasal cavity, and thoroughly saturated with plaster of Paris. It is introduced in the same manner as the "umbrella," of Dr. Harroun, and has this advantage: The sponge swells in the cavity, and takes a perfect impression of the parts. If any fracture occurs in withdrawing the impression, the meshes of the sponge hold the pieces so they can readily be placed in position. The inferior cleft, dental arch and roof of the mouth may be taken with an ordinary cup, as already described.

Occasionally persons are met with whose palate is so sensitive to the presence of a foreign substance, that it is impossible to obtain an impression of the parts desired, as vomiting and retching occurs whenever any attempt is made. All such persons should undergo a preparatory course of treatment before the attempt is made to obtain an impression. It consists in simply passing, several times a day, the bowl of a spoon over the rudimentary soft and hard palate, and antero-posterior wall of the pharynx. This course, if persisted in a few days, will enable the person to allow an impression of the mouth to be taken without difficulty.

(To be continued.)

DENTAL CLINICS.

BY ELIHU R. PETTIT, D. D. S.

There are many dentists throughout the country who have never visited a Dental College, and who have very erroneous ideas, not only in reference to the workings of such a college in general, but especially of the manner in which a dental clinic is conducted. I therefore propose, as briefly as possible, to give them some account of the clinic of Operative Dentistry, as conducted in the Pennsylvania College of Dental Surgery.

Our operating room, or clinic room as it is usually called, is a well-lighted room, 100 feet long by 20 feet wide, furnished with twenty-eight operating chairs, so arranged as to command the best light. Two of these chairs are reserved for the extraction of teeth exclusively, while the remainder are occupied by patients who desire to have their teeth filled or diseases of the mouth treated. The number of patients presenting themselves for treatment is so great, that it is very common for all of these chairs to be occupied by them at the same time.

The clinic room is also well supplied with forceps, elevators, &c., sufficient for the performance of the most difficult operations, and with all the medicines, &c., usually employed for the treatment of the various dis-

eases of the mouth. The students are divided into classes, and assigned to the chairs in regular order, and are expected to treat the mouth and teeth of the patients assigned to them by the Demonstrator, restoring them to a healthy condition.

It is a common practice, especially in the country towns, for dentists to take pupils into their office for a year only, before sending them out to practice dentistry on their own account. This time is generally spent in the laboratory, as it is very seldom that a preceptor will permit his pupils to operate upon his patients; so that about the only practical knowledge they get of the very difficult operation of filling teeth is by looking on occasionally while their preceptor performs the operation, and by filling a few teeth out of the mouth. With this little experience they "set up for themselves" at the close of their year of pupilage, and failure is a very natural result of their first attempts to fill difficult cavities in the mouth. What then? Not being able to insert a gold filling they resort to amalgam, which they find works very easily and nicely. Is it at all surprising that these dentists soon get into the habit of using amalgam in all cavities except the most simple? or that there is, as has been stated, more than a ton of amalgam used every year in filling teeth in the United States alone?

But how is it with those students who attend the Dental College? In the clinics they not only have the privilege of looking on while others operate, but they, themselves, are immediately set to work, under the supervision of the Demonstrator, upon simple cavities at first, and gradually proceeding to those of great difficulty. In this way they not only learn how to fill teeth properly, but they also gain that confidence in themselves and in their work which is so necessary to success in life. Nor is this all. By association with others, pursuing the same course of instruction, and by seeing the result of the labors of those who are in advance of them, a spirit of emulation springs up in them, so that they make greater effort to equal or excel the operations of others than they would did not this spirit of rivalry exist.

By reference to the appended report of the amount of work done in the clinic up to the 1st of January, 1870, (about one-half the session,) some idea may be formed of the immense advantages the clinic affords to those who seek its benefits. It is hardly necessary to say that all of this work is performed by the students, many of whom, except for the opportunity afforded them by the dental clinic, would obtain no practical experience in filling teeth, or treating diseases of the mouth, until they enter upon the practice of dentistry on their own account. This work will compare favorably with the operations performed in private practice. Indeed, it is not too much to say, that some of the fillings inserted by

the students in our clinic *cannot be excelled.* Of course, this refers particularly to the work of the second course students, as, among those of the first course, there are many who had never attempted to fill a tooth before they came here. But, with the advantages they here possess, the rapidity of their progress is often surprising.

The clinic is under the supervision of a Demonstrator, who is constantly passing from chair to chair, rendering necessary assistance, or giving information in reference to peculiar cases that may present.

Many suppose that the patients who present themselves at our clinic belong to the very lowest class of society. This is not the case. It is true, we have many from that class who come for the purpose of having teeth extracted, as they usually allow caries to progress until the teeth cannot be saved, or they do not appreciate the value of their teeth, and cannot be persuaded to submit to the long and tedious operation of having their teeth filled. Our patients generally are respectable persons who are in reduced circumstances, or those who are engaged in some employment, the remuneration from which is not sufficient to enable them to pay a large bill for dental work. The work performed in the clinic is, of course, entirely free of charge; hence, our institution is the means of doing an incalculable amount of good, and of relieving much suffering.

In conclusion, a cordial invitation is extended, to all who feel interested, to visit the College, and to examine for themselves the workings of the institution.

The following is a report of the work performed in the Operative Department up to the first of the present year. The session will close on the 1st of March, and the next number of the "TIMES" will contain a complete report for the session, both of the Operative and Mechanical Departments.

Number of patients visiting the clinic,	2092
Gold fillings,	556
Tin fillings,	346
Amalgam fillings,	24
Hill's stopping,	57
Oxy-chloride of zinc,	49
Treatment of pulp,	183
Superficial caries removed,	32
Treatment of periostitis,	22
Treatment of alveolar abscess,	34
Treatment of inflammation of gums,	16
Treatment of partial necrosis,	3
Removal of salivary calculi,	117
Extraction of teeth and roots,	2547

Dental Associations.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

At a monthly meeting of the Association, held Sept. 9, 1869, the subject of *oxychloride* of zinc was taken up for consideration.

Dr. BUCKINGHAM gave a condensed statement of the discussions had upon this subject at the Annual Meeting of the American Dental Association, held at Saratoga, in August.

Dr. J. TRUMAN'S use of this material was entirely experimental. The success that had followed justified its continued use. So far he had but few failures, and these did not involve the destruction of the pulp. They were confined to those cases where the pulp would not tolerate the presence of the oxychloride without severe and continuous pain. In his judgment it will require years before any positive opinions, for or against, can be given in regard to its value as a material for capping.

Dr. GITHENS had used oxychloride of zinc for capping, and with some degree of success. For sensitive dentine, he had found it very valuable.

Dr. WERT thought this material was undergoing the same experience as amalgam. At one time wholly condemned as unfit for use, and then taken up and almost universally used. He had abandoned it as worthless for filling teeth, but since he had heard such favorable reports at Saratoga, he felt in duty bound to try it again. The subject was then continued for further discussion at a future meeting.

Dr. GITHENS presented a valuable specimen of four central incisors, the central and lateral of each side united. He had inserted a silver pivot, in amalgam, fifteen years previously. Recently, the tooth was thrown out of the mouth by an accident, and on examination, the silver pivot was found still firmly imbedded in the root.

Dr. WERT had succeeded in reimplanting teeth in a person of twenty-two years, and desired the opinion of members present on the policy of this operation.

Dr. BUCKINGHAM doubted whether it was possible for the nerve, once severed, ever to reunite. A tooth may be dead and still retain its color.

Dr. W. H. TRUEMAN doubted the correctness of the theory upon which this operation was based, as in plastic operations the union must be kept up to insure success.

Dr. JAS. TRUMAN said that this operation was a very old one, it being a favorite with the celebrated Hunter. Dr. A. Mitscherlich, of Berlin, had given a very full report of his work in this direction. The success he and others had met with, warranted us in performing it when needed.

OCTOBER 19, 1869.

The subject of oxychloride of zinc, continued from the last meeting, was taken up for consideration.

Dr. Buckingham had made some experiments, but they were not as yet satisfactory to himself. He could not determine its solubility in water, there being no test for moisture. Some absolutely washes out, owing, probably, to the condition of the saliva. It is soluble in acids. The greater amount of acid the more solution. It absorbs large quantities of moisture. He used it for sensitive dentine, and fills pulp canals by placing it on the first piece of gold. It is mixed somewhat thicker than cream. In its antiseptic property it is fully equal to creasote. He had had some trouble in using it as a capping for nerves, and instanced a case where pain continued from eight to ten hours, and after extraction of the tooth found the pulp decomposed. He thought it was possible for oxychloride of zinc to preserve the pulp for years, and then, when its antiseptic properties have been lost, decomposition may ensue.

Dr. C. N. Peirce had not been a strenuous advocate for capping nerves. He thought a tooth with a live pulp of more value than a dead one. He had removed fillings of oxychloride of zinc, and found them in good condition. He had filled a number of teeth with it the past three months, and all as yet comfortable. In one of these there was a slight fungus growth of the pulp. He applied tissue paper, saturated with creasote, over the pulp previous to applying the cap. The patient had complained of shooting pains at a recent examination of one of these. He felt satisfied that the pulp was in process of destruction in this tooth. His success with paper, saturated with creasote, had been quite as good as with oxychloride. He was in favor of capping, if a reasonable hope existed of saving the tooth by that means, as the difficulties were many in filling roots. In the pulp canals he considered its use far preferable to creasote; owing to its antiseptic properties, it would produce equally good results. For capping purposes he did not think oxychloride possessed any virtues over many other things. He reviewed the history of the operation of capping in its various forms. The apparent success in these made him cautious in regard to this capping. This material he deemed very valuable for use in those thin shells of teeth that would not bear any other kind. He had made some experiments in combining this material with metal filings, and also with amalgam, but was not prepared to give an opinion upon it, further than that the combination made much more solid fillings than oxychloride alone. After a test of several months no change had been manifest in those inserted. He exhibited several teeth filled in this way. Gold filings combined with oxychloride, the latter

combined with amalgam; with the amalgam, mercury was used in the usual way.

Dr. BUCKINGHAM had used oxychloride to advantage in teeth to be filled with amalgam. He pressed the oxychloride against the walls to prevent the amalgam from coming in contact with them. He also used it in front teeth with thin walls. He had not seen the teeth treated in this way since, and could not report results.

Dr. J. TRUMAN'S experience in this mode of practice had now extended over two years, and during the last year he had almost exclusively confined the treatment of exposed pulps to the process of capping with this material. From his observations, success depended, to a large extent, on the condition of the pulp at the time the application was made. Where there has been a congested state of the pulp previously, the pain will be much increased. In one recent case, so excruciating had this been, that he was obliged to remove and destroy the pulp in the usual manner. The best results had followed the capping of pulps recently exposed, and where no pain had previously been experienced. He had examined a number of cases where the oxychloride had been in from two to four weeks, and, with one exception, had found the pulps alive. In those cases, where most pain resulted, there was apparently no loss of vitality in the pulp. So satisfactory had been the results, that he felt satisfied to continue and wait the only true test, that of time. One filling that he had constantly under observation, had now been in ten months. The pulp was fully exposed at the time the cap was placed. The tooth remains in a perfectly comfortable condition, and apparently as healthy as the adjoining teeth. In his judgment, it was immaterial whether the pulp died or not, if the antiseptic properties of the chloride of zinc would prevent decomposition. The disintegration of the pulp produced, by its irritating effects on the peridental membrane, all the difficulties we had to contend with.

Dr. BUCKINGHAM stated that oxide of zinc was usually impure. If this is taken and recalcined it will set very soon.

Dr. PETTIT had not had much experience. He had capped when possible. In one case the pain became so severe, in the course of two or three days, as to render extraction unavoidable. He had never filled permanently a tooth so capped. In one case, met with in Toledo, in a recent trip west, the dentist informed him that a slight pain, following the capping of a tooth, induced him to examine it, when the pulp was found entirely destroyed, but with no signs present of decomposition.

Dr. R. HUEY had capped nerves whenever possible. He had one case followed by severe pain, which, failing to relieve after several hours labor, he finally extracted it. He used the oxychloride to fill a portion of the cavity, and had been very successful in bleaching by its use.

Dr. PETTIT had one of his teeth filled by Dr. Truman over ten months ago. Pain followed for a few moments, each day, for a short time, and then gradually ceased.

Dr. WILDMAN had not used it for this purpose, as he had found, in former years, that the use of this article for sensitive dentine had often resulted in the destruction of the pulp.

Dr. TRUMAN thought this an unfair conclusion. He had observed that the use of oxychloride, on a thin plate of dentine, covering the pulp, was attended by far more disastrous results, than when applied directly to it. The cause of this was not very clear to his mind, but the fact was indisputable.

Dr. PEIRCE thought this was owing to the fact that oxychloride would irritate and produce a congested condition of the vessels in the pulp. If these had no room for expansion, there would be increased inflammation and final destruction, resulting from the confinement within the dense walls of the envelope; on the other hand, if the opening was clear, the pulp would expand and the inflammation subside.

The subject was further continued to a future meeting.

Dr. PETTIT spoke of the effects of a rubber plate in the mouth, composed of different kinds of rubber. When the red rubber came in contact with the gum, ulceration took place, and in none of the others. He presented several specimens of teeth, and plaster casts of irregularities, &c. Among the most interesting of these were the following:

No. 1. A block, consisting of three incisor teeth, carved from bone by a farmer, and worn with satisfaction.

No. 2. A superior molar tooth, showing the evil effects of supporting artificial dentures by means of clasps. The clasp had worn its way into the pulp chamber, and also into the nerve cavity of the palatal root.

No. 3. A plaster model, showing remarkable irregularity of the superior incisor teeth, and one supplemental tooth.

No. 4. A plaster model, exhibiting a natural bifurcation of the crowns of the superior central incisors, extending about one-half their length from the cutting edge.

No. 5. A plaster model of a dental arch, so contracted that it will scarcely admit of the end of the little finger.

[Nos. 1 to 5 were received from Dr. M. D. STONEMAN, of St. Anthony, Minnesota.]

No 6. A plaster model, showing irregularity of the left central incisor, and a supernumerary tooth. The supernumerary tooth occupies the proper position of the central incisor, while the latter is in front, and turned entirely around. This irregularity was corrected by extracting the central incisor. Perhaps it would have been better, if circumstances had

permitted, to have extracted the supernumerary tooth, and brought the incisor tooth into its normal position. An additional supernumerary tooth had previously been extracted from within the arch.

No. 7. Two superior molar teeth, with perfect osseous union of their roots, and slight exostosis.

[Nos. 6 and 7 were received from Dr. T. D. SIMONTON, of St. Paul, Minnesota.]

No. 8. A deciduous inferior lateral incisor and a canine tooth, with osseous union of their roots and a portion of their crowns. Received from Dr. D. C. PRICE, of St. Paul, Minnesota.

No. 9. A unique specimen of the complete ossification of the pulp of an inferior molar tooth. The ossified pulp completely fills the pulp chamber, without, however, being attached to its walls. Received from Dr. A. L. BAUSMAN, of Minneapolis, Minnesota.

No. 10. A superior molar tooth, showing a deposit of enamel on each side of the tooth at the bifurcation of the roots.

No. 11. A plaster model of the superior dental arch of a lad thirteen years of age, exhibiting two very peculiarly shaped supernumerary teeth. These teeth made their appearance immediately behind the central incisors, causing the latter to assume a very irregular position, and to separate from each other a distance sufficiently great to admit a large central incisor tooth. The supernumerary teeth are of unequal size; that upon the right side being about half as large again as the one upon the left side. The crowns are very much compressed antero-posteriorly, and have a fissure extending transversely across the grinding surface, and connected with one extending upon the posterior surface at the centre of the crown. The roots are very large; the smaller one being conical in form, the larger somewhat compressed antero-posteriorly, showing some tendency to divide. Neither of them are fully developed, yet they are quite as long as the roots of central incisors ordinarily are. They are curved backward, following the direction of the anterior portion of the palate.

[Nos. 10 and 11 were received from Dr. H. M. SHAW, of Fremont, Ohio.]

[Our thanks are due the above-named gentlemen for these valuable specimens, which will be deposited in the Museum of the College. Doubtless there are hundreds of such in possession of the dentists in various parts of the country, doing nobody any good, until finally they are either lost or broken. If such specimens were forwarded to the Pennsylvania College of Dental Surgery, S. E. corner Tenth and Arch streets, they would be of very great use as a means of illustrating the lectures, and would be gratefully acknowledged. They could be sent by mail, properly packed, at very slight expense. Models of irregularities should

be accompanied with a model of the mouth after treatment, and with a description of the means employed in correcting them.]

Dr. HUEY asked for instruction in a case he had under treatment, that of a pulp that resisted all attempts to destroy by arsenical paste. He had allowed the tooth to rest for three weeks after the first attempt; the second application of the paste was attended with similar results.

Dr. TRUMAN said it was not unusual to meet with pulps resisting all attempts to destroy them by arsenical paste. The cause of this was as yet unexplained, but the fact had occurred in the experience of almost everyone. In proportion to the extent of the congestion of the vessels of the pulp, will there be resistance to the action of the arsenic. In some cases in his own practice, accompanied with this result, there was apparently no inflammatory conditions present, yet there had been entire failure in the efforts to destroy them. His former practice had been to fill such teeth temporarily with Hill's stopping, and allow it to remain six months. If on re-examination the pulp manifested vitality, he capped with the same material, and filled permanently. Cases treated in this way had been examined after the lapse of several years, and were found comfortable and in healthy condition.

NOVEMBER 9, 1869.

At a meeting of the Association, held for discussion, Dr. W. H. TRUEMAN called attention to a new safety valve for vulcanizing, consisting of a brass tube containing fusible metal. He also presented specimens of copper, where explosions had taken place; also a tooth capped with oxychloride, and removed three years subsequently. The pulp had died in this, followed by alveolar abscess. This result he considered prophetic of future trouble in many similar operations.

Dr. SMEDLEY said if this was prophetic of trouble, he was heaping up a large amount for himself in the future, as he had used it in a large number of cases with apparent success.

Dr. BUCKINGHAM stated some cases in the use of oxychloride. He could not see how chloride of zinc could be used and not produce destruction. Try it on the tongue, or on any other tissue, and the caustic effect will be painfully perceptible. He did not wish to condemn it, but felt it must result in the destruction of the pulp.

Dr. SMEDLEY said, where pain had been excessive he had bled the pulp, and then filled. He had one tooth filled with this material in his own mouth. Becoming uneasy from the statements made by prominent members in the profession, he had had it removed, and found the pulp still alive. He recapped, and it so far remains comfortable. This pulp had been treated three times with arsenical paste without success.

Dr. Wert remarked that it seemed to him that failure to destroy with arsenic would probably result in failure with any other material. Success, in his judgment, depended more on constitutional conditions than upon anything else, and, consequently, capping could not prove a general success.

He instanced a case of bleaching a discolored tooth, upon which he had tried all the different modes suggested without result. In desperation he attempted Dr. W. H. Trueman's process of applying nitric acid. The result exceeded his expectations; the change being very marked in a few moments. He subsequently treated it with bicarbonate of soda to neutralize any remaining acid.

Dr. W. H. Trueman instanced a case of exposed pulp. The patient refused to have the tooth extracted. After several years the tooth was again examined, when the pulp was found capped with secondary dentine. The individual was addicted to the use of tobacco, but he thought the conclusion hardly justifiable that the constant use of this would produce a re-development of osteo-dentine. This would be too much like those we often see arrived at in our journals, upon equally slender premises.

In regard to the use of nitric acid in bleaching, he would say, that he had studied its effects in teeth in his own mouth. He had found a few seconds sufficient to produce a change of color.

Dr. Wert explained his mode of manipulation. He used a gold instrument and pure nitric acid. The root was first filled tight with cotton. The nitric acid was kept in the cavity one minute by the watch. On removing the acid the cavity was freely syringed and dried. He then applied the bicarbonate of soda; after which cotton, saturated with creasote, was kept in the cavity for two days. Upon examination, the tooth was found as dark as before treatment. It was then syringed again, and the acid reapplied, allowing it to remain five minutes. The action was not as rapid upon the second application, but the tooth was restored to nearly its natural color. He had not seen the tooth since the last application.

Dr. W. H. Trueman called attention to the necessity of using chemically pure nitric acid. He followed the use of this by chloride of lime, which would take up any remaining quantity of acid, and also continue the bleaching process. He also followed this with bicarbonate of soda and ammonia.

Dr. Buckingham had never known nitric acid used for bleaching, but had for the destruction of pulps.

Dr. Peirce said that the affinity between the acid and dentine would be very strong. It would follow the tubules, and remove the parietes and a large proportion of the tooth substance.

Dr. Buckingham remarked that this would be good theory if we knew whether the acid followed the animal matter of the tooth or removed the

inorganic. Nitric acid acted upon animal tissue and gave it a yellow color. If the animal matter in the tubes is changed from a dark to a yellow the tooth will necessarily be changed. He considered the subject an important one.

In regard to the valve presented by Dr. W. H. Trueman, he could say he had but little faith in it. Fusible metal loses its character by a continued high temperature. The thermometer does not always indicate the amount of heat. This can be demonstrated by allowing a small escape of steam, when the mercury will rise suddenly a number of degrees. In some of the large factories they use something to keep the water in constant circulation. It is merely a question of time how long our vulcanizers will last. The period has about arrived when the first crop disposed of were beginning to blow up.

Dr. W. H. TRUEMAN said, that a fusible metal that will melt at 350°, may be run up to 370° before it will blow out. In a smooth glass vessel heat may be raised to a high degree without boiling. The least jar relieves the latent heat and sudden expansion takes place. The same thing may occur in vulcanizers and produce explosions.

Dr. WERT had had his vulcanizers made very thick. He had found that, at 320°, the application of a wet finger to the vulcanizer produced a hissing sound. He therefore uses this as an additional test.

Dr. BUCKINGHAM suggested that a disc of copper, properly arranged, should be attached to our vulcanizers. These discs could be tested to known strengths, and would indicate the amount of force. J. T.

Editorial.

The new year finds us once again assuming the duties of one of the editorial corps, after an interval of nearly two years. We return to the charge aware of its cares, perplexities, annoyances and responsibilities, but with an earnest interest and desire to aid in the advancement of dental literature and science in general, and this Journal in particular. The DENTAL TIMES was originally designed, and was, for several years, exclusively an original journal. It is our aim to again make it such an one; the mouth-piece only for articles not to be found in each monthly. At the same time we shall have no hesitancy in reprinting some valuable paper, properly credited, which has appeared in some other journal. It is hoped that our friends, subscribers, and those interested in dental progress, will send us communications, which we promise to present in the best possible shape to our readers. This journal is especially identified with the best interests of the Pennsylvania College of Dental Surgery, and it is hoped that the friends, patrons and alumni

of that Institution will give us encouragement, not only by subscriptions to the TIMES, but by contributing articles for its pages. We ask them for this aid, promising, with such assistance, to place the DENTAL TIMES above all competitors.

The following gentlemen have been appointed agents for the DENTAL TIMES, and are authorized to receive subscriptions: Drs. H. R. Phillips and G. K. Bagby, for Southern States; Dr. C. E. Wilkinson, for Pennsylvania and New York; Dr. W. R. Rose, for New England States; Dr. J. E. Peirce, for Western States. G. T. B.

MALE vs. FEMALE MEDICAL STUDENTS.

The medical fraternity, and particularly the medical students of Philadelphia, have recently been greatly agitated by the introduction of women as students into the class of the Pennsylvania Hospital. The facts of the case are as follows: Without consultation with the medical or surgical staff of the hospital, and without statements to students, at the time of purchasing their tickets, that women were to be admitted to the hospital, the Board of Managers determined to allow them the privileges of attendance on clinical lectures. The first that was known of this change by the male students was from a statement made by one of the surgeons that, at the next lecture, women were to be admitted, and therefore they might expect that a certain line of surgical cases (syphilitic) would not in future be presented to them at the hospital clinic. The students who had purchased tickets of the Managers with the understanding that the same facilities, as in former years, for obtaining knowledge would be open to them, were extremely dissatisfied, and as a result, on the appearance of the women at the next lecture, a number of students greeted them with hisses, hootings and general ungentlemanly behavior. For this breach of politeness the medical students were censured by the entire city and country press, while the propriety of the presence of women at such clinics was considered by some as questionable, and by all as a distinct question from ungentlemanly conduct. On the side of the women students it was urged that every facility for instruction should be given them that was given to male students. That, as students of the hospital, holding its tickets, they were entitled to all its privileges, and that, notwithstanding their first reception, they intended to be present, at least at two clinics per week, there being two medical and two surgical per week, and that such knowledge was appropriate for women to possess in order that they might be properly fitted to perform the avocations of a physician. It was also urged that in other countries, in different cities, and even in our own city, in its largest hospital, this privilege had been extended to women without injury to either male or female students.

On the part of the male students it was contended that it was an innovation on an established custom, which, though truthful, was not logical; that patients objected to expose their persons before mixed classes of students; that they would be debarred from witnessing many operations, and very many morbid conditions, which the delicacy of the attending surgeons or physician, or patient, would prevent from exposure under such circumstance. That as women claimed to be actuated by a desire to attend to the diseases of their own sex, it was inappropriate for her to be present, as the great majority of patients presented were males, with diseases which women would not be called upon to treat.

The students of the two colleges, University and Jefferson, by and with the approbation of their Faculties, determined not to attend the hospital clinics if "mixed clinics" were tolerated. Both sides appealed to public opinion through the newspaper press in able and well-digested articles, and in this appeal the public said both sides were right, both were wrong. Women should have instruction in medicine equally with men, but it should be separate instruction. It also blamed the hospital managers for not telling students, at the time of application for tickets, of the change in their rules. The women, finding public opinion so strongly against them, receded from their original position, and were willing to have separate clinics for themselves, once per week. The Board of Managers of the hospital have recently, in a communication to the Medical and Surgical Board, requested them to hold alternate clinics for men and women students. Thus the subject stands at present. Our own belief is, that in this judgment public opinion was right.* G. T. B.

GOODYEAR RUBBER COMPANY.

Every thing which looks to an overthrow of this unjust monopoly must be welcomed by the suffering dental profession. We, therefore, are pleased to see that some others besides the dentists are attempting to slay this dreadful Goliah.

UNITED STATES SUPREME COURT.

In the Supreme Court, to-day, the case of the Providence Rubber Company against Charles Goodyear, executor of Charles Goodyear, deceased, the Union Rubber Company and the Phœnix Company, an appeal from the Circuit Court for the District of Rhode Island, was taken up, and will occupy two or three days in the argument. The case involves the validity of the extension of the Goodyear patent, which, it is alleged, was obtained by fraud on the Commissioner, and many other minor questions. The argument was commenced by Mr. Payne for the appellant.—*Associated Press Report.*

* Since the above was in type we learn that the women have, *as usual*, gained their object, a decision having been arrived at by the Board of Managers and the Medical and Surgical Board, to have a "mixed clinic," one surgical and one medical per week.

We have received the following contributions to our College Museum, for which, in the name of those seeking knowledge, we return our thanks: From Dr. F. A. Ramsay, Norristown, Pa., a valuable specimen of alveolar necrosis; Dr. Du Bois, Greenville, Ala., rare and various abnormal conditions of teeth, also teeth taken from the ancient mounds of Alabama; Dr. F. R. Thomas, rare specimens of dental exostosis and atrophy; from Messrs. Worrall & Babcock, the displaced tooth; and cast showing hypertrophy of gums, referred to in their articles published in the present number of the Times.

Selections.

SCARIFICATION OF THE GUMS IN DENTITION.

At a meeting of the "Edinburgh Obstetrical Society," Dr. Cairns gave the following views on this subject, which we present in full to our readers, as they appear in the *Edinburgh Med. Journal.*

"I. Is scarification in dentition productive of any beneficial result? If it is so, in what do its good effects consist? The advantages alleged to accrue from the operation, as contained in the several works which I have consulted, may all be summed up in the following: First, the relief of local pain; and, second, the prevention and arrestment of convulsions, laryngismus stridulus, diarrhœa, &c.

1. Scarification, according to its supporters, relieves local pain. Conceding, meanwhile, that this assertion is true, let us inquire into the grounds on which the assertion rests. Now it certainly cannot rest on the declaration of the little patients on whom the operation is performed, because they have not yet acquired the power of speech—a circumstance indeed which renders the treatment of the diseases of children in general of a very difficult and unsatisfactory nature, preventing them as it does from correctly indicating either the precise seat of their sufferings, or the actual effects of the remedies employed. Well, if the allegation is not, and cannot be founded on the ground I have mentioned, it must, in these circumstances, be altogether and entirely of an inferential character. Now, the value of inferences is purely determined by the character of the data from which they are drawn. If the data are true, the inferences may be valid or they may not; but if the data are not true, the inferences must, as a matter of course, be utterly worthless. In the present case, then, what are the data from which it is inferred that scarification is productive of relief from pain? These data will, I think, be found on inquiry to consist in the tense, tumid and congested condition of the gums. The matter stands thus: the gums, in the process of dentition, being in a tense, swollen and inflamed state, are painful; and, by relieving the tension, tumidity and congestion, by means of incisions, you thereby relieve pain. This, I opine, is a correct and fair statement of the case. Well, now, I demur entirely to the alleged fact, that in the *ordinary* process of dentition the gums are either tense or swollen. It is quite true that there exists over the site of the approaching tooth an evident fullness; but this condition is caused, in all ordinary cases, by the presence of the tooth itself. The tissue overlying the tooth is not put into a state of strain by

the tooth, as the term tensity would lead one to suppose. No such thing; against such tension nature makes full and ample provision, by causing the subjacent gum to undergo gradual absorption in proportion to the growth of the tooth itself. The tooth is not *pushed* up, it *grows* up; and as *it* increases in growth, so do the overlying tissues become absorbed, thereby rendering tension impossible. Neither is there swelling in the ordinary sense of that term, because nature guards effectually against the infiltration of serum, by causing the growth of the tooth to be sufficiently slow, so as to give the vessels concerned abundant time to accommodate their calibre to the circumstances by which they are surrounded; and if a true swelling does in any case actually form, that is to be regarded simply as an accidental occurrence, and to be treated, of course, as it would be in ordinary circumstances, but it is in no wise essentially connected with the process under consideration. If, therefore, there is neither tension nor tumefaction, scarification is useless as a means of relieving pain, so far as regards the alleged disturbing influences of these two conditions. But what of inflammation? Simply this, that by abstracting blood from an inflamed part, you do not, in the least degree, either reduce or modify the inflammation. The part continues to be as red, as hot, and as painful as before. Nor do I hold it of much consequence to be told that the child has become more quiet after the operation, and must therefore have obtained relief by its means; because, unless its advocates are prepared to prove the result to be invariable—which they are not—I am fully entitled, in the circumstances, to assume, that such relief may have followed in spite of the operation, just as many patients have been found to recover from certain diseases in spite of the very questionable treatment to which they may have been subjected.

2. Scarification is alleged to prevent and arrest convulsions, &c.

Now, as a prophylactic remedy, the operation can only be admissible under certain conditions: 1*st*. On the ascertained fact, that convulsions are an invariable accompaniment of dentition. 2*d*. That the operation uniformly, or at least generally, prevents their occurrence. The question, therefore, is, do these conditions hold? I affirm they do not, and on the following grounds: because convulsions, so far from always coexisting with the process of dentition, do so in reality in a very small proportion of cases. They constitute, in fact, not the rule, but the exception. And further, the object sought has in general not been attained; that is to say, convulsions have just as frequently followed as they have preceded incisions of the gums. So much for the preventive; and as regards the alleged curative agency of scarification, several questions naturally suggest themselves:—

(1.) Does it necessarily follow that dentition is the real exciting cause of the convulsions, merely because the latter happen to be concurrent with the former? Every one, I dare say—even the most zealous advocate of the operation—would unhesitatingly answer in the negative, when the question is put in this pointed and direct manner; nevertheless, I am rather inclined to think that there exists in the minds of most practitioners a strong predisposition to attribute every case of convulsions which occurs in a child within two years old to the so-called cutting of a tooth, and to that alone, unless other causes are so manifest as can hardly escape notice. Nor is the reason of this far to seek; for, in the first place, it is universally admitted by every member of the profession, that dentition may, and

does, occasionally, induce convulsions; in the second place, there exists a strong tendency in the human mind to connect certain effects with their most commonly received causes, whether true or false, and this circumstance has always operated in a very special manner in the minds of medical men.

(2.) A second question which suggests itself is, has a recurrence of the convulsive fits, which happen to take place during dentition, always been prevented by scarification? An affirmative answer to this question would justly be held quite conclusive, at least as regards the particular circumstances referred to; but unfortunately, I have not been able to find any one, within the compass of the research which I have made, who ventures to give the desiderated answer. On the contrary—unlike those who dogmatically proclaim, as an infallible remedy for this and that disease, this and that specific, which no other than themselves have ever been able to verify—even the most strenuous supporters of scarification allege nothing more than simply that after the operation has been performed, the convulsions have ceased to recur only now and again.

(3.) And this brings us to a third question, viz: Whether, in those cases in which convulsions have ceased after the application of the lancet to the gums, the use of this instrument is to be regarded as the real procuring cause of their arrestment? Now, I do not by any means venture to say that it is not. This were too audacious by a great deal; but I do say, and without the least hesitation, that there exists more abundant data from which to give an answer in the negative than there do from which to give one in the affirmative. What, we ask, are the grounds on which the scarificator is employed? Because, say its advocates, after being applied, convulsions occasionally do not occur. And that is really the only answer which can be given. Very good; but when they are again asked, if they can affirm with certainty that the use of the lancet has been the actual and sole means of stopping the convulsions, they feel obliged to be somewhat more cautious in the answer which they give. Their reply then is, It may be, or it may not be—we cannot absolutely say which. Well, in these circumstances, we must be excused for expressing our humble opinion that the greater probability is, that it has not been so; first, because the use of the lancet has just as frequently been followed by the *recurrence* of the convulsions as by their *discontinuance;* second, because their non-recurrence may have been a *mere matter of coincidence and nothing more.* It is well known for example, that in different children convulsions differ, both as regards their number and duration. In one child there is often only one convulsive attack, sometimes of short and sometimes of considerably long duration; in another, we often find two, the one either following the other in close succession, or at a longer interval. Sometimes we find three, and so on: but when they are dependent on dentition, or other local irritation, they always prove of a self-limiting character. Suppose, now, that in either of these cases you incise the gums, and that, after doing so, the convulsive attacks cease to return, are you entitled to give the credit to the lancet? If you say yes, I maintain that in the circumstances I am equally entitled to say no; because, in all probability, the convulsions had entirely ceased before the gums had even been touched by the lancet.

The same arguments which have been employed in the case of convulsions apply equally to the other diseases which I have mentioned as

concurring with dentition, and, therefore, I may pass them over without further notice, merely adding that, although diarrhœa is perhaps one of the most common comitants of dentition, it seems somewhat strange that scarification should be so seldom practised, or even recommended for arresting that most debilitating of all the ailments to which infants are liable.

II. Having considered the beneficial, I now proceed to notice, in the second place, the prejudicial effects of scarification.

1. And here I allege, in the first place, that it is injurious, because it impedes the process of dentition. During the last few days I have asked several professional brethren with whom I have come in contact, who approve of the operation in question, for what reason they do so? and the gist of the answer which I have received from each has been this: "Because," say they, "the lancet does at one stroke what nature would require a considerable time to accomplish to let the tooth through." And this quite accords with what we find in some of the books. Now, we aver the opposite. We aver that the use of the lancet, instead of rendering dentition more easy, makes it in reality more difficult. And here we must observe that, in scarifying the gum, three different modes have been recommended—*1st*, by making a single incision; *2d*, by making a crucial incision; and *3d*, by making an elliptical incision, and removing that portion of the gum which overlies the tooth. Well, if either of the first two methods is adopted, in nine cases out of ten you have speedy reunion of the lips of the wound, thereby leaving matters exactly as they were before. If, as recommended by some, you go on repeating the incisions, you have just the same result following; thus rendering it extremely difficult for us, at least, to perceive how the approach of the tooth can be facilitated in the least degree by these means; while, at the same time, the hard cicatrix which has been formed must require longer time to become absorbed as the tooth approaches than the soft natural tissue of the gum. If the wound heals by ulceration—and by this process it must do so, when the third method is employed—you do certainly obviate thereby the absorption of the gum, and thus seem to assist nature. But this, after all, is more apparent than real; because absorption is undergone not only in that portion of the gum which lies over the summit of the tooth, but also in the portions toward its sides—portions, be it observed, which are left altogether untouched. But even although these portions were also removed, the truth of our averment would, in our opinion, be only strengthened thereby; and in this way, because you would thus expose a greater portion of the tooth to atmospheric influence, premature exposure to which, by the removal of its natural covering, would give a material check to its growth and development. Consider, also, that by the operation, simple though it seem, you give a greater or less shock to the nervous system of the infant—and it is universally admitted that an infant at this period is in a state of high susceptibility, that you excite more or less inflammation, thereby increasing the suffering and irritability of the little patient; that you cause the loss of a certain quantity of blood, of which a child is highly intolerant, and particularly those children on whom the operation is performed, being generally of delicate and strumous habits; that you aggravate the painful condition of the gums, thereby rendering sucking a difficult operation, and preventing the infant from obtaining a proper supply of nourishment.

Consider, we say, these circumstances, and the injurious effects which they must necessarily produce on the general constitution, and through it on the growth of the teeth, rendering that process, as they must do, unusually tedious and slow.

2. We allege, in the second place, that it may lead to fatal hæmorrhage. We are not in a position to state how often this result has followed from the operation; but if all the cases which have occurred had been recorded, and were collected, they might be found to amount to no inconsiderable number. At all events, it is well known that such cases have occurred, and, indeed, it is only very recently that a case of this nature was reported to this Society by one of its members. To this, however, it may be objected—1*st*, That in those cases in which the child has died from loss of blood, the incision may have been made too deep; our reply is that the incision is recommended to be made deep, so deep as to reach the tooth. 2*d*, It may be objected, that fatal cases may only have occurred in those children which happened to have the hæmorrhagic diathesis; we answer, that even although this were granted, you cannot discover whether this diathesis is present or not, until you make the incision, when the discovery is too late. 3*d*, It may also be objected, that the risk alluded to occurs so seldom that it need not act as a deterrent: to this we reply, that the untoward results under consideration having happened even once or twice, renders it at least possible that it may also occur in the very case in which you are about to operate; and moreover should it do so and should you tell the parents on inquiry that you were aware that such an event might possibly occur, I rather fear that the parents would not hold you altogether blameless in the matter, and that they would bear you a secret grudge ever after.

3. I allege that it tends to perpetuate a custom which, to say the least of it, is of a doubtful character. Probably one of the main reasons why the operation is so generally performed is, not in reality from the good effects which are expected to ensue from it, but because it is usually done in such circumstances. Others do it, and in order not to appear singular or culpable, I must conform to the general practice, whether the issue should prove favorable or the reverse. In this way did the treatment by blistering, bleeding and violent drugging become transmitted from generation to generation, age after age, producing, as it is now universally allowed to have done, the most direful results. And in the same way has been handed down the operation in question, which, though uncertain and doubtful in its results, continues to be in high favor and general use as a time-honored custom. On this point, however, we do not enlarge, but proceed, as was proposed, to inquire.

III. If, in the circumstances, scarification is justifiable? We allege that it is not. 1, Because it inflicts unnecessary pain. The objection, observe, is not grounded on the fact that pain simply is caused to the child. Such an objection were absurd; because, although the medical practitioner holds it to be one of his prime functions to relieve pain, in many cases he can only fulfill that function by employing remedies which are themselves of a pain-giving nature. But this is not the question. The question is, am I warranted in employing a remedy which, so far as can be ascertained, does not relieve the pain which it is intended to do, and which remedy is itself painful both in its application and results? I maintain that in these circumstances I am not justified in doing so, and particularly when I remember the effects which scarification on one occasion produced in my

own person. For it so happens, that when some years ago, my last wisdom-tooth was making its appearance, the late Professor Miller, at my own urgent request applied the lancet over it, but the result was, that instead of experiencing relief from the operation, it kept me, on the contrary, in a state of the most extreme suffering for days to come; the remedy, in short, having proved a thousand times worse than the disease.

2 It superinduces some of those very conditions which it professes to remedy. I allude in particular to tension, tumefaction and inflammation, the relief of which, it will be remembered, was alleged as a reason why scarification should be performed. On that occasion, I simply endeavored to show that the treatment recommended had no rational grounds on which to rest; I now go a step further, and aver that scarification actually produces these results. Inflammation it must and cannot but excite; because, in virtue of a well-known physiological law, wherever you occasion a breach in living tissue, more or less inflammation results, in order to repair the breach which has been made. Again, in an inflamed part there is always more or less swelling, owing to the pressure upon the veins, which causes the exudation of serum into the surrounding cellular tissue. And, lastly, there is tension; because, whether the scarified part heals by the first or second intention, there is, in either case, contraction of the tissue, and consequent tension, if an unyielding structure like the tooth lies underneath.

I shall not be so bold as to affirm that scarification actually excites convulsions; but, considering the extreme sensitiveness of the gums, and the highly nervous condition of the child in some cases of teething, I do think that that operation is abundantly sufficient to act as an exciting cause of them. And it is certainly a fact, that there are some parents who will not allow the gums of their infants to be incised on any account, because in the case of former children, they have observed the operation to be followed by convulsions; and parents are very acute and often very correct observers in reference to the ailments of their children—a fact which renders their testimony in such matters of no inconsiderable value.

3. At the best, it is a mere experiment. This, I think, cannot be denied, with whatever view the operation may be performed, whether to relieve pain, or whether to arrest convulsions, or any of the other symptoms which have been mentioned as coincident to dentition. If you perform the operation to relieve pain, you do so simply as an experiment, because, in the first place, you do not know if the pain from which the child appears to suffer is due to the state of the gums at all; it may depend upon causes totally different. In the second place, granting that the gums *are* the prime source of the irritation, how do you know that the *part* of the gum which you incise is the real seat of the pain? You perceive a certain portion of the gum to be somewhat prominent, and find at the same time that the child gives certain expressions of suffering, and you thereupon immediately leap to the conclusion that the pain is occasioned by that particular part of the gum. Are you *certain* that it is so? You are not; you cannot be. The *greater* probability is, that the irritation is entirely due to the growth of *a* tooth, which, owing to the early period of its development, gives no indication whatever of its appearance. In the third place, even although you could hit exactly upon the precise tooth which caused the pain, how do you know whether it is the *superficial* or radical part of the tooth which gives rise to the pain? Whoever has suffered from toothache, must know that the pain in *many* cases arises

from the *root* of the tooth, and not from the crown, showing that the former is just as likely to be the seat of pain as the latter; and consequently, that in scarification, the object sought will most probably prove altogether abortive, and, therefore, out and out experimental.

And, as regards convulsions, etc., scarification of the gums is a thousand times more doubtful in its results than as regards the relief of pain. Who can deny on how many occult causes such phenomena may actually depend? But simply because a child happens "to be getting its teeth" while a convulsive fit occurs, the convulsion is at once attributed to the state of the gums. The gums are forthwith lanced, and if the convulsions cease, the lancet gets the credit; if they do not cease, *as in general they do not*, the lancet nevertheless is extolled as having done all that could have been done to avert bad consequences. But now, allowing scarification to be nothing more than an experiment, is it or is it not justifiable? To this I reply, that it is only justifiable on certain grounds. An experiment is not justifiable—1*st*. When there is no essential connexion between the disease and the alleged cause for the removal of which the experiment is made. 2*d*. When it has repeatedly failed to produce the desired result. 3*d*. When it is likely to be more injurious than beneficial. These points, however, I simply state without enlarging upon them, having greatly exceeded the limits to which I had restricted myself."

While we are not prepared to endorse all of the views of Dr. Cairns, which we have laid before our readers in full, yet at the same time we are no advocates of indiscriminate scarification of the gums of children during first dentition. We can hardly suppose it possible for anyone who has had experience in this matter to deny that the lancing of tumefied gums is a relief; or that convulsions may be prevented by this operation.

While it is true that it is a question with many whether the too early scarification of the gums does not impede the eruption of the teeth, from the cicatrix resulting offering more resistance to the advancing tooth than the gum in its original condition, at the same time we had supposed that every one would admit the relief it affords to the tension exerted in the tumefied part.

If we deny that the irritation of dentition is capable of producing convulsions, then Dr. Cairns' theory that scarification does not arrest these nervous disorders but aggravates them, may be a correct one.

It is true, fatal results have attended some cases where this operation of lancing the gums has been performed, but in such cases only where the child has afforded unmistakable evidence of a hæmorrhagic diathesis, as is shown by blood deficient in fibrine and red globules, and consequently wanting in the power of coagulating; or a condition of blood due to the action of mercury—in other words impoverished.

For we know that mercury will decompose blood; and Dr. Wright, who has analysed the blood of patients under mercurial action, states that it is materially changed, containing more water, and being more prone to putrefaction than healthy blood, the destructive agency depriving it of one-third of its fibrine, one-sixth or more of its globules, and at the same time loads it with a fœtid matter, the product of decomposition.

In our opinion Dr. Cairns has advanced nothing which proves the operation of scarification a dangerous and useless one in all cases; but, on the contrary, we consider it one of great benefit in the vast majority of cases where the proper indications exist for its performance.—*Editor of American Journal of Dental Science.*

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PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The Fourteenth Annual Session, 1869-'70.

PRELIMINARY LECTURES AND INSTRUCTIONS.—The Dispensary and Laboratory of the College will be opened on the 1st of September, where ample opportunities will be afforded the student, until the close of the session, for the prosecution of the practical part of the profession, under the guidance and supervision of Demonstrators of known integrity and capability; and during October Preliminary Lectures will be delivered. In this month, as well as through the entire session, a clinical lecture will be given, and operations performed by one of the Professors every Saturday afternoon.

THE REGULAR SESSION

Will commence on the first Monday in November, and continue until the first of March ensuing. The course is so arranged that about eighteen lectures will be delivered each week on the various branches taught in the College. A synopsis of which is given below:

CHEMISTRY.

The Course of Instruction from this Chair will commence with the considerations of the forces that act upon matter, and the laws which govern those forces Chemical nomenclature, the individual elements, and the compounds resulting from their combination, will then be considered. The course will be illustrated by diagrams and such experiments as can be performed before the class.

MECHANICAL DENTISTRY AND METALLURGY.

The instructions from this chair will embrace—the proper fitting up of a dental laboratory, the use of tools, refining, melting, alloying, and working of the precious metals, and the properties and combinations or alloys of the base metals used by the dentist; the description of the materials, their preparation, and the most approved formula for making porcelain teeth and blocks, together with the proper manner of compounding them; the history and properties of all substances called into requisition in making dental substitutes; the entire range of manipulation of the different materials used as a base, from the impression to the completion, and proper adjustment of the case in the mouth, and such other information as appertains to this chair. The lectures will be amply illustrated by specimens, models and diagrams, and the practical application will be given in the Laboratory, under the supervision of an accomplished Mechanical Dentist.

DENTAL PATHOLOGY AND THERAPEUTICS.

The lectures delivered from this chair will embrace General Pathology, Dental Pathology, the Pathological Relations of the Teeth to other parts of the System, together with a minute description of all special diseases that have any relation to Dental Surgery, or of interest to the Dentist. They will also include a careful examination of therapeutic agents and their general application. Their indication in the medical and surgical treatment of diseases of the mouth, both idiopathic and symptomatic, will be fully illustrated. Special attention will be directed to the application of all the Anæsthetic Agents.

ANATOMY AND SURGERY.

The instruction in this department will embrace a plain and comprehensive view of the structure of the human body. The lectures and the demonstrations will be given over *the dead body dissected for the express purpose* of elucidating the subject. With the same object, vivisections on the lower animals, while under the influence of an Anæsthetic Agent, will be employed. Such description of the comparative anatomy, microscopical structure and connections of the teeth, as their importance may demand, will be fully given. The valuable and extensive collections of Anatomical Preparations of the incumbent of this chair, consisting of wet and dried specimens, papier mache manikins, models in wood, and accurate French plates, will enable him to illustrate his course of lectures very clearly.

In addition to the above course, a Surgical Clinic will be held by Doctor Forbes during every week, for the purpose of performing such operations in oral and general Surgery as may be deemed advisable to advance the student in this particular branch of knowledge. The cases will be selected from a dispensary which the Faculty have established.

DENTAL HISTOLOGY AND OPERATIVE DENTISTRY.

The lectures of this department will embrace the comparative anatomy of the teeth, the functions and microscopical pecularities of the dental organs, the development of teeth and their component tissues. It will also include a full description of the materials and instruments used in operative dentistry, and will comprise a thorough elucidation of all the operations required of the Dental Practitioner, such as filling, extracting, regulating, &c. &c. A portion of the course will be devoted to a description of the microscope and the modes of preparing specimens. The incumbent of this chair will practically demonstrate in the clinic the theories taught.

CLINICAL INSTRUCTIONS.

In addition to the above, with the exception of Saturday, four hours are daily spent by the student in actual practice under the supervision of the demonstrators.

IN THE OPERATIVE DEPARTMENT.—To afford every facility to the student to acquire a thorough practical knowledge of this branch, the operating rooms are furnished with twenty-eight chairs, so arranged as to command the best light, and all the appliances for comfort and use. To these chairs the students are assigned in classes, and certain hours are fixed for each member of the class to operate. Every student is required to provide his own instruments, except those for extracting. He is expected to keep them in perfect order, and will be provided with a place in which they can be locked when not in use.

IN THE MECHANICAL DEPARTMENT.—In the Laboratory are all the conveniences for the preparation of the metals, manufacture of teeth, single and block, mounting, &c. Every process known in the profession, which has any value to the mechanical dentist, is fully taught, and receipts of valuable compounds are freely imparted; and the student is required to go through all the necessary manipulations connected with the insertion of artificial teeth—from taking the impression of the mouth to the entire construction of the denture, and its proper adjustment in the mouth of the patient. Every student is required to furnish his own bench tools, and will be provided with a drawer which he can lock.

PRACTICAL ANATOMY.—The great facilities for the study of practical anatomy to be found in Philadelphia, in several well ordered and supplied dissecting rooms, present to the student advantages for its prosecution superior to those offered in any other city.

HOSPITAL CLINICS.—In addition to the facilities afforded by the College for a thorough course of instruction in the theory and practice of dentistry, the celebrated hospitals and clinics of the city constantly enable the students to witness various important surgical operations which are highly interesting and instructive. The medical and surgical clinics of the Pennsylvania and Philadelphia Hospitals, two of the largest eleemosynary establishments in the world, are open to medical and dental students, free of charge.

FEES.

Matriculation, (paid but once,)	$5 00
For the Course, (Demonstrator's ticket included,)	100 00
Diploma,	30 00

TEXT BOOKS AND WORKS OF REFERENCE.

Leidy's or Gray's Anatomy; Carpenter's or Kirk's Physiology; United States Dispensatory; Pereira's, Biddle's or Stille's Therapeutics; Fownes' Elements of Chemistry; Regnault's Chemistry; Lehmann's Physiological Chemistry; Hartshorne's Principles and Practice of Medicine; Wood's Practice; Tomes' Dental Physiology and Surgery; Harris' Principles and Practice; Taft's Operative Dentistry; Richardson's Mechanical Dentistry; Wildman's Instructions in Vulcanite Work; Barker on Nitrous Oxide; Gross' or Erichsen's System of Surgery; Paget's Surgical Pathology, or other standard works on the subject.

QUALIFICATIONS FOR GRADUATION.

The candidate must be twenty-one years of age. He must have studied under a private preceptor at least two years, including his course of instruction at the College. Attendance on two full courses of lectures in this institution will be required, but satisfactory evidence of having attended one full course of lectures in any respectable dental or medical school, will be considered equivalent to the first course of lectures in this College. Also satisfactory evidence of having been in practice five years, inclusive of term of pupilage, will be considered equivalent to the first course of lectures.

The candidate for graduation must prepare a thesis upon some subject connected with the theory or practice of dentistry. He must treat thoroughly some patient requiring all the usual dental operations, and bring such patient before

the Professor of Operative Dentistry. He must, also, take up at least one artificial case, and after it is completed, bring his patient before the Professor of Mechanical Dentistry. He must, also, prepare a specimen case to be deposited in the College collection. The operations must be performed, and the work in the artificial cases done at the College building. He must also undergo an examination by the Faculty, when, if found qualified, he shall be recommended to the Board of Trustees: and, if approved by them, shall receive the degree of Doctor of Dental Surgery.

CANDIDATES FOR GRADUATION WHO HAVE NOT ATTENDED LECTURES.—Dentists who have been in continued practice since 1852, are eligible to be candidates for graduation without attendance on lectures. The candidate for graduation must present satisfactory evidence of his having been in practice for the allotted time, also of his good standing in the profession. He must prepare a thesis upon some subject connected with the theory or practice of dentistry. He must present specimens of his workmanship. He must undergo a satisfactory examination by the Faculty, on each of the branches taught by them; when, if qualified, he shall be recommended to the Board of Trustees, and if approved, shall receive the degree of Doctor of Dental Surgery. Of this class of graduates, the matriculation and diploma fees only are required.

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THE

DENTAL TIMES.

VOL. VII. PHILADELPHIA, APRIL, 1870. No. 4.

Original.

CLASS MICROSCOPES.

WITH REMARKS UPON THEIR USE IN TEACHING.

[Read before the Biological and Microscopical Section of the Academy of Natural Sciences of Philadelphia, and directed to be published.]

BY JAMES TYSON, M. D., LECTURER ON MICROSCOPY AT UNIVERSITY OF PENNA.

As the result of an extended experience in the use of class or clinical microscopes, both in teaching histology and clinical medicine, the writer feels justified in briefly asking the attention of the section to a subject which he cannot but consider of importance to all interested in demonstrative teaching.

A class or clinical microscope may be defined as one which admits the study of microscopic objects while it is being passed about a class from member to member.

The use of such instruments finds its advantage in the importance of exhibiting to the student of natural science the object as it naturally presents itself, undistorted by defective drawing.

The indications in class microscopes, in addition to those of the ordinary compound instrument, are these: 1st. They should permit the object glass to be clamped at the proper focal distance, while there still remains provision for differences in vision which necessarily occur among a large class of students: 2d. They should permit the object to be tightly clamped upon the stage of the microscope; and 3d. The clamp should be so attached to the stand that it will secure an unchanging illumination for the object, by transmitted or reflected light, while the instrument is being passed around the class.

The first microscope of this kind which accomplished these objects at all satisfactorily, was the clinical microscope of Dr. Beale, as improved by Mr. Highley, of London, and of which the microscope first exhibited is one.

The figure largely explains itself—*a* is a cylindrical tube attached to the base *h*, and expanded into a trumpet-shaped extremity, between which and two spring clamps attached at the edge of this expanded extremity, is placed the slide carrying the object. One of these clips is provided with a screw, by means of which it can be further tightened. Within

Fig. 1.

FIG. 1.—BEALE'S CLINICAL MICROSCOPE IMPROVED BY HIGHLEY.

this tube is a second of the same length, (concealed by the outer tube in the drawing,) which receives the tube *b* carrying the object glass; *c* is a brass milled ring, by turning which the object glass may be immovably fixed at the proper focal distance, the adjustment being made by the hand applied to the tube carrying the objective; *d* is a tube carrying the eye-piece, made to slide within the tube *b*, by which movement the microscope is well adapted to varying vision, since a considerable movement is here permitted without changing the image formed by the object glass, whereas, a very slight movement of the tube carrying the latter would seriously disarrange the picture; *e* is the lamp, which, when placed directly in front of the object, illuminates it by transmitted light, and when moved around to the side on the centre *f*, permits its light to fall through the opening *g*, thus illuminating the object by reflected light. When the object is adjusted and clamped accurately in focus, it will be seen that the microscope can be passed from one to another without much risk of the image being deranged. This instrument, with lamp and two object glasses, an inch and a quarter inch, is sold for £3 in London.

But the defects in this microscope are two. 1st. The focal adjustment, for high or low powers, must be made by moving a tube within a tube, and by the hand directly applied to the former; this becomes especially irksome when the microscope must be held up in the other hand while it is being accomplished. 2d. The relation of the slide to the trumpet-shaped extremity is such, being tightly compressed against it, that in an extemporaneous preparation the thin glass cover is apt to be pushed off, and the object ruined.

It was not until these defects were amply realized, by actual experience,

that the writer called the attention of Mr. Jos. Zentmayer, of this city, to them, who devised and constructed the microscope figured below.

Fig. 2.

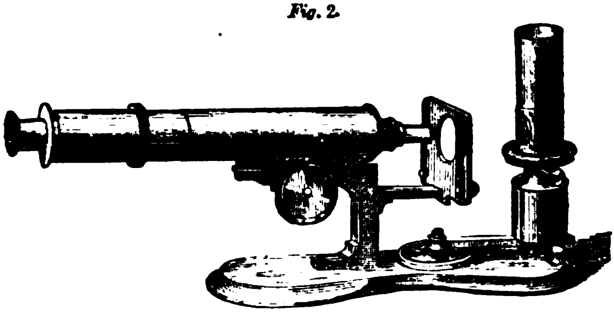

FIG. 2.—ZENTMAYER'S CLASS MICROSCOPE.

It will be seen that in this instrument, the focal adjustment is provided for by a milled head, rack and pinion, thus obviating the inconvenience resulting from a movement of a tube within a tube by the hand applied to the former, while the objective is fixed at proper focal distance by removing the milled head, thus obviating any interference by members of the class. The allowance for differences in vision in different individual members of the class is accomplished by a draw tube movement, similar to that in the instrument of Dr. Beale, easily recognized in the diagram.

Again, the stage is independent and separate from the tube carrying the objective, so that the second inconvenience of Dr. Beale's microscope is also obviated. The secure clamping of the slide is likewise accomplished by a screw passing through one of the clips. The arrangement of the lamp is precisely similar to that of Dr. Beale's instrument; but in Mr. Zentmayer's later instruments the chimney is a metallic one, with a piece of mica covering the opening opposite the object glass, thus obviating the inconvenience involved in breakage, uncleanliness and handling a separate glass chimney. We do not hesitate to say, that for the purposes of a class microscope alone, we have found this instrument by far the most satisfactory of any we have used; it is, indeed, the only microscope which conveniently answers all the indications of a demonstrating instrument. In one respect only is it inferior to Highley's Beale. It is something heavier, but this is a trifling inconvenience. The wooden base is, moreover, hollowed out upon each side, as seen in the cut, furnishing thus a convenient means of holding the instrument, and when we consider that the portion *h*, of Beale's instrument, is not practically adapted for seizure by the hand, the inconvenience of weight is counterbalanced by the facility in handling. This provision could, however, be easily supplied in the wooden base of Beale's instrument.

This microscope, with lamp, two eye-pieces and two objectives, a $\frac{1}{5}$ and an $\frac{8}{10}$, neatly packed in walnut box, are sold by Mr. Zentmayer for $58

The objectives are the same as those he furnishes with the so-called "army stand," and are well adapted for the objects for which intended. Moreover, the workmanship, in all portions, is the very best, which is not the case with class microscopes generally.

It sometimes happens, however, that it is desirable to use a microscope as well for purposes of ordinary microscopic study as for illustrative demonstrations; and where students are taught the use of the microscope, and to study tissues for themselves, this becomes important. Now, these class microscopes, from the necessarily horizontal position of the tube, are evidently most inconvenient for such study, and to obtain a double set of stands involves an amount of expense which few teachers are able to bear; hence, it becomes of very great advantage to have a microscope which can be used for both purposes. Such a microscope is the class microscope of Mr. Charles Collins, of 77 Great Titchfield street, London, and constructed under the direction of Dr. Lawson.

This microscope was described quite two years ago in the London *Medical Times and Gazette*, but we are not aware of its having been exhibited or used in this country prior to the importation of this instrument by the writer.

Such a microscope is exhibited, and figures 3 and 4 explain its appearance and use.

Fig. 3 presents the microscope as an ordinary working stand. To convert it into a demonstrating microscope, we have only to draw it out of the mirror tube and slip on the lamp, as in Fig. 4. This microscope is, moreover, provided with milled heads, rack and pinion, for coarse adjuster, (not shown in the figures,) and a screw fine adjuster, so that it is, indeed, quite complete. There are no means provided, however, to prevent tampering with the adjustments by students, so that the object is apt to become deranged in passing about the class. With older students, however, or those having had some experience in the use of the instrument, this becomes a less serious objection; and when we consider its general utility, it becomes the most useful of the class microscopes we have seen, though it is clearly not as suitable for class demonstration as that of Mr. Zentmayer. This microscope, however, could also be so constructed as to admit the removal of the milled head after the adjustment is complete, and thus be made to answer the most important indications of the class microscope, while its

Fig. 3.

screw fine adjuster furnishes the most satisfactory means of accommodating differences in vision. The stage is also independent, and provided with spring clips, though more perfect means of securing the

Fig. 4.

object immovably could also be here added. This microscope, as described, and provided also with a wheel of diaphragms, concave mirror with adjustments, double nose-piece to take the two objectives, by means of which the latter can be instantly changed without the trouble of unscrewing, a one-inch objective, a quarter, and a brass lamp, is furnished by Mr. Collins, in a polished pine case, for £4 17s, or, in mahogany case, for £5.

Similar in object is the class microscope of Murray and Heath, London, figured in the sixth edition of Hogg on the Microscope. It consists of the usual microscope body, which can be inclined at any angle, with a mirror on a ball and socket joint; also. a stage plate with universal movement. When to be used as a class microscope, the slide is placed in a shallow box, into which it is locked by a key, which also locks this box firmly on the stage plate, as well capable of being clamped. The focal adjustment being made, the body is locked in its place by the same key, and the final adjustment is made, as in Beale and Zentmayer's instruments, with the eye-piece. The body is then placed horizontally, and fastened with a screw. It is now ready to be passed around the class without possibility of injury to object or object glass. The illumination is obtained, as in Beale's and Zentmayer's instruments, with low powers by holding toward a window, or with medium and higher powers by a lamp properly placed. This microscope would appear, from its description, to accomplish its object well, and has this advantage over that of Collins, in that it has a base on which to stand when arranged for *class* use. We have, however, never seen the stand, and know nothing of its weight or cost.

The so-called "pocket" microscope of Mr. Tolles should, perhaps, be included among class microscopes; but as it admits of use only when directed toward a lamp, or other source of light, its utility as a demonstrating microscope is limited. It consists of a simple tube, six inches long, with a quarter-inch objective and B eye-piece, fine and coarse

adjustments for focus, a stage with clips to hold the object, which can be removed when not in use, and the objective covered with a brass cap. Price, $25; with a draw tube for increasing power, $30.

Perhaps all of these class microscopes could be improved, but we regret that their use has not become sufficiently general, in this country, at least, to justify very much attention on the part of instrument makers, and it is one of the objects of this paper to extend their use by pointing out the advantages arising from it: for we believe this to be the sole method in which the student can be taught the true appearance of minute objects, and when used in conjunction with carefully prepared diagrams, or the gas microscope, will afford the fullest knowledge of such objects. Nor is there any limit to its application, since we have used "an eighth" object glass, with a deep eye-piece, to produce a power of 600 diameters, without any appliances to condense the light, and this with perfect satisfaction before classes of 150 men and upward. Not only this, but we have even used them in lectures, of a somewhat popular character, in which a mixed audience of ladies and gentlemen, numbering over 500, have passed them from one to another, and subsequent inquiry has shown that they have understandingly studied the specimens. Dr. Beale has used a "twelfth" magnifying 700 diameters. Thus we can obtain a range of power, from the lowest to the highest desirable for teaching purposes. This is not possible with the gas microscope, at least with natural objects, though this instrument has recently become quite available in teaching. For, although the latter instrument can be used with great advantage, with comparatively large natural objects and low powers, we have not yet seen a satisfactory exhibition of an object calling for even so low a power as the circulation of the blood in the web of the frog's foot, sufficiently amplified to permit it to be well seen at a distance of more than ten feet, and even such demonstration we confess to have been but little more satisfactory than a good drawing; for although the blood, by this means, is seen to be moving, and the general contour of the object is shown, yet the appearances are far from being as truthful as when studied by the ordinary microscope. Now, the demonstration of the circulation is one of the easiest objects shown by the class microscope, since it requires but a low power, and ordinary diffused daylight is sufficient illumination, so that the lamp may be entirely dispensed with. If it be said that the use of the high powers may be accomplished with the gas microscope and photographs, the photograph, which, at best, gives us but a surface picture, and of but a single layer of structure at the same time, merely takes the place of the diagram, and ordinarily does not resem-

ble the object better than a *well executed* diagram, so that the clinical microscope would be even here necessitated to complete our knowledge of the subject. We do not wish to be understood as underrating the utility of the gas microscope; for, when available, it becomes a most useful adjuvant. But we believe it takes the place, not of the class microscope, but of the ordinary enlarged diagram; and even for this purpose, when we consider that it requires, almost invariably, the aid of a special assistant, and admits ordinarily, but a single picture to be shown at one time, a little thought will suggest many instances in which it will be but an embarrassing aid. It is true, objects may be arranged in groups and then photographed, whereby a set may be thrown upon the screen at one time.

But any one who has had experience in teaching such a subject as physiology, will recall how constantly it becomes necessary to change any order which may have been adopted, or to interpolate a new drawing, so that we are inclined to believe that there will always be a necessity for such means of illustration as are afforded by class microscopes. And even should the ordinary diagram be totally substituted by the gas microscope, the class microscope still remains a useful adjuvant to our means of illustration, and we are confident that those who may be induced to make use of it will find it of growing utility, while the makers will also be encouraged to extend the latter by improvements in construction and facility of use. We wish, also, to have it well understood, that the class microscope is no substitute for diagrams, since it would be impossible to demonstrate points which should be seen by all the members of a class at the same moment, but, as stated, it is in *conjunction* with such aids to teaching as diagrams or the gas microscope, that it becomes most available.

No indifferent reason for cultivating the use of this microscope in teaching, is the fact which we believe well established, that students are themselves stimulated to work with the microscope by a familiarity which they thus acquire with its rudimental working, as well as with the correct and often fascinating appearance of natural objects.

We especially desire to call attention to Mr. Zentmayer's stand as the most available and best for purely clinical purposes, though that of Mr. Collins has, perhaps, a wider utility. Where but a single or two microscopes are desired, however, and where it is more particularly desired to demonstrate, as in teaching physiology or clinical medicine, without occasion for the student himself to practice, Mr. Zentmayer's will be most suitable.

ON PRESERVATION OF THE TEETH.

BY SAMUEL FISHER HOWLAND, D. D. S.

The human body is an organization of matter containing a vital principle or life force; and is so wonderfully constructed, so curiously wrought, and so intricate in all its parts, yet so perfect and harmonious in its action, as to excite in the thinking and contemplative mind, feelings of astonishment and awe; and though science has been diligent in her researches for centuries past, and brought to light much that was hitherto unknown concerning this wonderful piece of mechanism, and of the anatomy and function of its numerous parts, there is yet room for the investigating mind to go still farther in pursuit of this knowledge, and still deeper in the mine of hidden truths, that the world may become more enlightened in self-knowledge, more familiar with the anatomy and physiology of the body we inhabit, and with the laws which govern its action; then will be realized more fully the profound meaning of that saying, "man is fearfully and wonderfully made."

Each constituent part of the body has its appropriate office to perform, and is necessary to the completion of the whole; but if any member fails in the performance of its office, the system is more or less affected or deranged thereby; hence the importance of preserving that even and perfect balance of health, that the various functions of the body may be performed unobstructed, and the harmony of the system be maintained.

Among the many members and organs of the body, one class is of peculiar interest to the student of dental science, and of vital importance to every individual, viz: *the teeth.* These are the principal organs of prehension and mastication, whose office it is to prepare food for the stomach, that its nutrient portion may enter into the substance of the body.

In building a structure, there should be a firm foundation, suitable materials and the requisite appliances, else there will be defects frequently manifest in the work; and the structure will be imperfect and incomplete. For the proper mastication of food good teeth are necessary; without these food must pass into the stomach improperly prepared for the action of the gastric secretions, and for the succeeding processes of digestion, which ultimately end in its nutrient properties being converted into blood, to supply the waste of, and build up the system; hence a portion of material is lost: the blood is deficient in quality and quantity; the body suffers for want of needed supply, and from an undue and unhealthy action of the digestive organs in their effort to perform their proper function; therefore it is of the highest importance that the dental organs should receive that care and attention so essentially necessary to their preservation, that nothing may be wanting in this direction for the healthful promotion of the vital organism.

The temporary teeth are twenty in number, and are developed by the mucous membrane covering the edges of the maxillary arches, commencing at the sixth week of fœtal life; their eruption beginning at the seventh month of childhood, and is complete about the end of the second year—those of the lower jaw preceding those of the upper jaw.

These subserve the purposes of mastication during childhood, and are the forerunners of the permanent teeth to which they give place in due time.

The development of the permanent teeth commences about the fourteenth week of fœtal life; they begin to erupt about the sixth year of age, and are complete at the age of fourteen, excepting the wisdom teeth, which are usually erupted from the seventeenth to the twenty-first year. Each tooth consists of three portions—the crown which projects above the gum, the fang or root, entirely concealed in the alveolar process, and the neck, the constricted portion between the crown and fang.

The roots of the teeth are firmly implanted within the alveoli; the socket is lined with periosteum, a highly vascular membrane, which is reflected on to the tooth at a point of the fang, and covers it as far as the neck. At the margin of the alveolus the periosteum becomes continuous with the fibrous structure of the gums.

In the interior of a tooth is found a hollow cavity, situated at the base of the crown, and is continuous with a canal which traverses the centre of each fang, opening at the apex by a minute orifice. The shape of the cavity corresponds somewhat to that of the tooth, and contains the dental pulp.

The solid portion of the tooth consists of three structures—the dentine, which forms the larger portion of the tooth, the enamel, which covers the crown, and the cementum covering the fang. Dentine differs in structure and chemical composition from osseous tissue. It consists of twenty-eight parts animal and seventy-two parts of earthy matter. The enamel is the hardest portion of the tooth, and consists of ninety-six and five-tenths per cent. of earthy, and three and five-tenths per cent. of animal matter. The cementum, in structure and chemical composition, resembles bone. It contains the lacunæ and canaliculi; and the lamellæ and Haversian canals, peculiar to bone, are found in it to some extent.

The teeth, under certain conditions, and with proper care, will last longer than any other portion of the body. Perfect sets of natural teeth are rare, and to so frightful an extent has disease worked the destruction of these organs, that well may the inquiry be made, what can be done for their preservation?

The teeth, like other tissues of the body, are nourished through the blood by the food we eat, and those kinds of food which contain the material

that enters into the structure of osseous tissue should be taken in sufficient quantity to supply this demand; especially do children need this element, that their teeth may be more fully developed, and to give them the requisite density to resist the action of those agents coming in contact with them, which tend to break down the structure; that they may be preserved till the child reaches adult age, which may be considered as a point of *comparative* safety.

The first thing to do is to learn the causes of the premature destruction and loss of the teeth. In looking back to that period, when the mode of life was very simple, when people labored hard and partook of a plain nutritious diet, the teeth, as a general rule, were better than they now are; luxuries were fewer, and the whole manner of life was far different from the artificial mode of living at the present time; thus man living in a natural condition and following the teachings of nature's laws and his own instincts, tends to the better development of his physical being, than the way a large portion of people now live; hence, we may conclude that an artificial mode of life, sedentary habits, undue mental labor, want of bodily exercise and improper diet, all of which tend to bring the body into an abnormal condition and thus derange the system, are some of the causes which act directly and indirectly to the destruction of the teeth; for their better development and preservation, there must be a radical change in habit and diet, and particularly should the bony element be contained in the food we eat to a good degree. If bread, the staple article of food, was generally made unleavened and of unbolted wheat, a marked change would be observed in the general character of the teeth. Bolted wheat is deprived of just that part which is needed to make bone and build up tooth structure, important parts being given to animals, and mankind suffers the consequences and must pay the penalty.

Condiments generate acid which breaks down the enamel of teeth, then caries begins and carries on its destructive work. Medicines are a predisposing cause of caries, sometimes by direct contact with the teeth, and sometimes indirectly by changing the secretions of the mouth. Improper diet and habits frequently cause dyspepsia which works the destruction of the teeth. Any modification of diet and nutrition will affect the teeth. The use of tobacco causes absorption of the gums and denudation of the fangs of the teeth; inflammation follows till extraction brings relief.

Caries is not fully understood; there are various theories concerning it. The present one is, that it is a vegetable fungous growth, its life depending on moisture.

The enamel of teeth is broken down by mastication, by the extremes of heat and cold and by acid secretions, then the dentine is destroyed by caries. This is the most common way that teeth are destroyed.

Besides constitutional remedies, for the preservation of the teeth, they must be treated directly. The mouth and teeth should be cleansed; all useless teeth and fangs which are uncleanly and a source of irritation and annoyance should be removed, otherwise the breath is contaminated, impure air is taken into the lungs, and the general health thereby impaired. One diseased tooth frequently prevents the use of nearly all the teeth on one side of the mouth, which use is essential to their cleanliness and health, otherwise tartar is deposited on them, the gums and periosteum are irritated and inflamed, and the patient suffers. Teeth are kept in a much healthier condition by use; hence the importance of removing the obstructions which prevent this. They should be carefully and properly cleansed of all foreign matter, then by the daily use of brush and powder, they can be kept in a cleanly condition; by this, and the use of some astringent mouth wash, the gums will become harder, more dense and healthier. All carious matter should be removed from cavities in the teeth, and each filled with the greatest care and thoroughness.

Simply "filling a tooth" is an expression incomplete in its meaning, when is taken into consideration the work to be done. A portion of dental tissue is removed by disease—*it is lost*—a cavity is formed, and the prevailing idea is, it must be *filled*, taken for granted, when this is done, that disease is arrested and the tooth saved, so far as filling can save it; whereas, the reverse may be and often is the case. The grand idea to be kept in mind by every dental practitioner should be, *restoration*. A portion of tooth is *gone*, and, to save the remainder, there must be a perfect restoration of the part lost by artificial means; thin broken enamel should be cut away, all decay removed from, in or about the cavity, the parts prepared for the retention of the filling, and then completely, solidly and perfectly filled with pure gold, and those precautions taken which will insure the tooth against the destructive elements which are continually warring against it.

Filling a tooth is but one of the means of preserving it; though all-important in itself there are other means of preservation which belong to the patient, and, if neglected, will render the work of the dentist, in a measure, fruitless, however thoroughly it may have been done. It is not enough that the mouth and teeth are put in proper order once, as if that was sufficient for a lifetime—care and cleanliness of these must *never* be neglected. The teeth, from the time of their eruption, should be used carefully, watched closely, treated judiciously by their owner, and under the direction of a competent dentist. This requires time, care, attention and pecuniary means, and causes some inconvenience; but these are necessary to their preservation, and are little, comparatively, providing the object is accomplished; this every patient should be taught. It is a *posi-*

tive duty of the dental practitioner to teach and instruct his patients as they need, and so wisely discriminate and judge, that his instructions shall be adapted to the one taught and dispensed, without giving offense or violating the rules of propriety. He should "be all things to all men," that perchance he may save some.

The responsibilities of the dentist are obvious to every faithful practitioner. His work is not wholly a pecuniary one. A new era in our profession is dawning upon the world, and he who participates in its advancement should be governed by honesty, truth and integrity, and be actuated by the highest motives, that the public may be educated to a right appreciation of its advantages, and may we hail the day as not far distant when the value of the natural teeth shall be so highly estimated, and the efforts for their preservation be so richly crowned, that artificial teeth may be the exception, and beautiful teeth of nature's provision become the rule, then will be illustrated one of the highest objects of our mission, viz: *the preservation of the teeth.*

MASS.

VALUABLE FAILURES.

BY J. F. BABCOCK, D. D. S.

And if an interrogator were to inquire what I meant by the above subject, I would answer, any failure properly *appreciated* becomes valuable, and many times, with the conscientious dentist, its experience is even more so than the most brilliant success. Failures imply either error in judgment or a lack of knowledge, and who, in these respects, are perfect? Success, *complete* success, demonstrates the acme of human exertion, in whichever direction it may be achieved; and therefore, in its own peculiar merit, leaving *nothing to learn.* Such successes are indeed precious to ourselves, but especially so to our patients, and it is because of an earnest desire to perform our duty, our *whole* duty, toward *them*, that we strive "with all the strength that in us lies" to reach the highest attainment possible; therefore, to achieve perfect success should ever be, professionally, our highest ambition. It cannot be obtained at once; it is only by constant, untiring study and experience, oftentimes wearisome and discouraging, that those who seek it *sometimes* find it.

Failures of a greater or lesser magnitude will stare us in the face every day, but such failures to the dentist, conscientiously striving to do his duty both toward himself and his patient, will be *valuable;* for they will prove to him wherein he has erred, and eventually lead him into that "straight and narrow way" to a perfect success, however few there be who find it. Without further argument to prove the oftentimes worth of failures, I will proceed to speak of some of my own in the use of that

material commonly known as oxy-chloride of zinc, or os artificial, and although it is not a particularly pleasant matter to publish one's failures, yet "hope's whisperings" counsel me to feel that they may eventually prove to the profession, as they have to me in experience, *valuable*. If so, I shall at least feel that I have performed a duty.

Nearly one year ago, after reading in the various dental journals the different articles, pro and con, and hearing the subject thoroughly discussed in several Association meetings in Philadelphia and elsewhere, I concluded to give the os artificial a fair and impartial trial as the "savior of exposed pulps;" opportunities were not lacking, and in the course of six months I had treated some fifty, (and here I stopped to see the effect,) which, at the time of their presentation, were aching with different degrees of intensity. My first step in the operation was always to excavate as much of the decay as possible, taking particular care to remove any substance which might be acting as the immediate cause of irritation to the pulp, and then for the purpose of reducing the inflammation, I applied creasote upon a pledget of cotton, protecting *this* with cotton and sandarach, allowing the patient to go and return within forty-eight hours, when, if no pain had ensued, it was my practice to remove the evidences of the previous treatment, replacing a new and small pledget of cotton, slightly moistened with creasote, directly and lightly over the exposure of the pulp. I then proceeded to fill with the os artificial, taking care not to press it too tightly upon the point of exposure; the pain following this procedure would vary from slight to intense, and from two minutes to an hour's duration, when it would gradually cease and disappear altogether. I then dismissed the patients, with orders to return any time within two months that best suited their convenience, for the purpose of having the os artificial protected by a complete covering of gold, in order that it might not be washed away through the action of acids in the saliva.

Everything "went merry as a marriage bell," for, in response to inquiries, the answers would be, "not a particle of pain;" "the tooth never felt more comfortable," &c. Took out some of the fillings and replaced them upon finding the pulp alive and apparently healthy. No case that I could find had proved, in the slighest degree, a failure, and I began to hope that the pulp had at last found a "fellow feeling," which was making it "wondrous kind;" but alas, for the fragility of human expectations, the storm has at length broken upon my unprotected head, and *fifteen* out of the fifty have made their appearance, *every single one* burdened with an abscess. How many more there are to come, He alone can tell; but I confidently expect a call from all the rest eventually. None which have so far appeared showed any evidence of future trouble for at least six months after being filled, and most of said cases, especially

those in the superior maxilla, I trust I have succeeded in saving, by treating the abscess with the proper remedies; at all events they have yielded to them, and in all instances are doing well. So much for my experiments with oxy-chloride of zinc. In my hands, and I believe in many others, it has proved *worse* than useless; for had I originally, as is my custom, destroyed the pulp, extracted it, thoroughly cleansed the canal or canals, filled them, and, in fact, *properly* treated the tooth, I should have been saved much time, expense, trouble and vexation of spirit, but therein is my failure *valuable*. Oxy-chloride has its uses in dentistry, many of them important; but in my opinion *not* as a "savior of exposed dental pulps." *Why* not I will endeavor to make clear in some future communication.

BANGOR, MAINE.

ALLEN'S CONTINUOUS GUM WORK.

BY T. HASBROUCK, D. D. S.

There is so little said or written on this subject, that it seems to have been almost entirely neglected of late, not only in the dental schools, but in the columns of the journals. Continuous gum with a platina plate properly put up is, in the opinion of the writer, the most perfect thing in the way of artificial dentures that has ever been produced. This will, no doubt, appear to some as a very broad assertion, on account of their having seen very ugly looking specimens of the work in some mouths, and other objections have been its weight and liability to fracture when dropped. Others, that are not unfrequently urged are, that it is impossible to mend it after it is once broken, and that the plate will warp in baking, and consequently be a misfit when completed. All of these objections would be good ones if they had any foundation in fact, which any man who has a thorough knowledge of the work can easily demonstrate to be untrue.

We have seen a great number of cases of this work that were improperly made, and such coming under the observation of any good dentist, would very naturally give him the impression that, practically, continuous gum work is worthless, unless he happened to know how it *should* be done. There is but one way to do anything, and that is to do it right, and if this work is done in that way, it will be just as strong and durable as any, and much more natural and cleanly than any I have ever yet seen.

The plate, for a practical case, should be about No. 28, by gauge, and the French platina is preferable on account of its being smoother, brighter, and less likely to have cracks and fissures in it than that which is made from scraps and rolled out. The plate should be

swaged in the same manner as an ordinary metal plate, being careful to keep the base metals from it in annealing. Get the articulation the same as in any case, and the teeth can be placed in most any position required. After they are arranged on the wax as desired, it is well to put plaster enough around the outside to hold them firmly in position while being backed and soldered.

Then invest in plaster and asbestos, first putting a stiff platina wire across the heel of the plate to keep it from warping or springing while being baked. The backing should consist of about three separate pieces of platina, and cannot be too stiff or strong; solder with pure gold. It should not be soldered in the furnace, as the teeth will be very likely to be etched and spoiled by overheating while in the investment.

Heat them to a cherry-red in the furnace, and then melt the solder with the blow-pipe. After cooling off remove the investment, taking care to preserve the base with the wire in it to bake the piece on afterward. Put the piece in acid to remove the borax, and then wash thoroughly with soap. The case is then ready for the body. After the first coat, the cracks and fissures caused by the shrinkage must be carefully filled, and it will come out of the furnace the second time smooth and ready for the enamel, which can be put on thick or thin to suit the case, and shaded as desired.

The baking and furnace work is the most difficult part, and can only be learned by practice. There are many little annoyances that the beginner has to put up with, and gasing is perhaps the worst one. If it is heated up too fast it will snap and fly. If the case is gased, it is ruined, and might as well be made over at once. It will look blue, and be rough and spongy. A little practice and instruction from any one who understands it will enable one to overcome all these difficulties. As for the work breaking down easily, it will not do it in the mouth, and is no more likely to fracture than any other, unless dropped on marble or some other hard substance. If a patient has the misfortune to drop and break them, they can be repaired just as easily as any other work, and can be mended to look well, though, generally, after being mended two or three times they are not so strong as at first. The same may be said of almost any work.

To those who are fortunate enough to know how to do this work, this will, of course, be without interest. It is meant for those who do not, of whom, I am well aware, there are a great many in our profession. I do not wish to convey the idea that continuous gum is better than anything else, but have said these few words, hoping that there may be some interest awakened in its behalf, and am very sure that whoever takes it up, masters it, and uses it properly in his practice, will never have reason

to regret it. I would not recommend its use for partial plates, but for entire upper, or under, or both, I think it is without an equal in most cases.

PHILADELPHIA, PA.

AMALGAM.

BY CHARLES H. BAGLEY, D. D. S.

In my school days I had a companion, whose motto was, "putty and paint." When engaged in the execution of any of the numerous projects by which he worked off the superfluity of his boy's energy and nerve force, as, for instance, the building of a boat, his haste and eagerness to accomplish what he had undertaken, left many an open joint and glaring imperfection, which sadly marred the beauty of the finished whole. At such times the boy would cry, "Putty and paint! Putty and paint will cover it all, and no one will know what is beneath." Nobody did know the real state of affairs at first, but the dashing young builder was soon made aware that something was amiss, when, after a few days of hard service, the water worked its way through the open seams in spite of putty and paint, which were intended for show, not use, and the poor boat, becoming rheumatic in the joints, and generally invalid, was laid up in ordinary, a victim to putty and paint. Navigation being thus abruptly closed, and his ardor dampened by the wetting of his feet and a very fluent coryza, the boy would resolve, every time he sneezed, to make haste more slowly in future, and abjure his favorites. His reformation usually lasted until he was ready to build another boat.

It seems to me that many men, who take up dentistry simply as a means of making money, and not as a profession in which they have any pride, are like the boy boat-builder. His only thought was how to fasten the boards together as quickly as possible, give them a respectable outward appearance, and then take a ride. He could not spend the requisite amount of time in acquiring skill in the use of tools, nor for learning what were the best ma.erials and model for his boat. He did not care for the excellence of his work; he only wanted to row in a good-looking boat. The so-called dentists cannot waste two or three years in acquiring professional knowledge and skill, when, in a few weeks, they can learn to scrape out the tooth cavities, and fill them with amalgam putty, to which, with the aid of a burnisher, they give a bright polished appearance, which sends the patient away pleased, while the operators put the money in their pockets and are satisfied with themselves. When the evil effects of this work on their patients and practice become evident, they sometimes repent. The reformation endures until new patients enter the office.

The use of amalgam has done more to lower the average degree of opera-

tive skill in the dental profession than any other cause. This result, however, would be of slight importance if amalgam was a better material than gold or tin for filling teeth. If its color closely resembled that of the teeth; if it was a non-conductor of caloric; if it was unalterable under the influence of the fluids of the mouth; if it exerted a beneficial preservative action on the teeth, with no injurious effects whatever, still retaining its present plasticity, which makes it so much of a favorite; if, I say, amalgam possessed these properties, the skill now considered necessary in him who works with gold and tin would be no longer needed, for a carious tooth could, in that case, be put in better condition without this great skill than it now can be with it. Unfortunately, amalgam has none of the properties enumerated above, except plasticity, but it does possess decidedly objectionable characteristics, and often produces very injurious effects; in fact, it is totally unfit to be used as a material for filling teeth ordinarily, and in certain exceptional cases only is it admissible, as I shall endeavor to show.

All drugs or medicines are poisons to the healthy body, and nature protests and rebels against them, showing that they never should be introduced into the human system except in cases of necessity, or for scientific purposes. Even in sickness, the tendency has been for many years to give less and less medicine, as it has been found that small doses do as much good, and far less harm, than the massive doses of the old heroic practice.

Lord Bacon laid it down as an axiom, that medicines shorten life.

It being true of all medicines, that they should never be needlessly introduced into the system, how very careful should we be in the use of powerfully poisonous agents like mercury. Yet every time that we insert amalgam fillings in the teeth, we incur the risk of poisoning our patients with this drug. The amalgam is placed where the fluids of the mouth can and do come in contact with it constantly. That they can and do act upon it we may infer, from the fact that it frequently becomes discolored, and sometimes porous and friable; from the fact, perhaps, that the tooth becomes discolored, often for a considerable depth, showing the formation of a soluble compound which has been absorbed by the tooth; from the fact that saliva always contains elements which unite readily with mercury when brought in contact with it, and from the fact that these elements are often present in the nascent condition from the decomposition of binary compounds, and are, therefore, in the most favorable condition for acting in concert with any substance for which they have an affinity.

According to Berzelius, as quoted by Dr. Piggot, in 1,000 parts of saliva, there were found—

Water,	992.9
Ptyalin,	2.9
Mucus,	1.4
Extract of flesh and alkaline lactates,	.9
Chloride of sodium,	1.7
Soda,	.2
	1,000.0

The water, of course, contains oxygen, and the saliva has the property of absorbing great quantities of this element, of which there is always an abundant supply in the atmosphere.

Berzelius also found in nasal mucus—

Water,	930.7
Mucin,	53.3
Alcohol extract and alkaline lactates,	3.0
Chlorides of sodium and potassium,	5.6
Water extract, with traces of albumen and phosphates,	3.5
Soda, combined with mucus,	3.9
	1,000.0

No close analysis of buccal mucus has been made, owing to the difficulty of obtaining it pure; but as pulmonary and other mucus contain nearly the same constituents as nasal, we may consider that this analysis represents that of buccal mucus also.

On examining this saliva and mucus, we find in them water, furnishing oxygen and hydrogen; the chlorides of sodium and potassium, furnishing chlorine; and albumen, furnishing sulphur, with which it is usually combined. Of this combination a common illustration is seen in the rapid discoloration of silver spoons when brought in contact with eggs; the sulphur in the albumen of the eggs being the discoloring agent. Any one of these agents, except hydrogen, is capable of acting on mercury, tin and silver.

The galvanic currents set in motion by the unequal action of the saliva on the different metals in the amalgam, or on the amalgam and gold, when both are present in the mouth, can decompose the saliva, and then we have the oxygen, chlorine and sulphur in the nascent condition, and ready for work.

As I mentioned before, amalgam fillings, and the teeth filled, are frequently colored dark or black after the amalgam has been in the mouth for some time.

The oxide of silver, AgO, is black, slightly soluble in water, and forms decidedly poisonous colorless salts, with acids, of which there are often some present in the mouth.

The suboxide of mercury, Hg_2O, is "brownish-black, decomposing by light and warmth into oxygen and the metal." It is quite active as a

poison, but is, fortunately, not very soluble, and by its deposition on the surface of the amalgam, may retard, and sometimes even stop, chemical action on the filling.

The protoxide of tin is also black, but is not apt to be formed as oxygen has not so strong an affinity for tin as for silver or mercury. This is also the case with sulphur and tin, and I shall, therefore, not take into account the action of tin.

Sulphur has so strong an affinity for silver, that sulphuret of silver, AgS, "is spontaneously formed whenever silver is brought in contact with a sulphuret, either gaseous or liquid. So strong is the affinity of this metal and sulphur, that it has been used as a convenient test for the presence of sulphuric acid." Sulphuret of silver is dark brown, and is nearly insoluble in water.

The subsulphuret of mercury is black, and not very soluble. It is not so active in its effects on the system as the black oxide of mercury, but is still able to produce a decided impression. These compounds, any one of which may be formed when amalgam is in the mouth, are sufficient to account for the discoloration of the fillings, and by the solubility, although slight, which they possess, may be partially explained by the discoloration of the tooth, it having absorbed the solution.

Last, but not least, chlorine is present, watching eagerly for a chance for a raid in the enemy's country, and unless the out-posts are guarded by a picket of insoluble sulphuret, he will surely get possession, and then will be formed the subchloride of mercury, Hg_2. Cl., calomel, or the chloride of mercury, Hg. Cl., corrosive sublimate. Think of calomel or corrosive sublimate being absorbed into a man's system, slowly, but steadily, for six or eight years! The bare idea is enough to make one's mouth water.

The presence in the mouth of any of the compounds I have enumerated must be deleterious to the health; for, as I have said, the oxide of silver readily forms poisonous soluble salts, with nitric and other acids often present in the mouth. The suboxide of mercury is easily decomposed by light and warmth into oxygen and the metal mercury, (the latter is soluble in the buccal fluids,) "and gives up its oxygen to deoxidating agents generally." In contact with hydrochloric acid, which may be found in many mouths, it is readily decomposed, "the reaction yielding water and the subchloride of mercury or calomel." The subchloride of mercury is well known to be an active and powerful drug, while chloride of mercury, or corrosive sublimate, is an intensely corrosive poison.

The effects of mercury on the system are well known; but Dr. Piggot gives so excellent and concise a summary of them, that I shall quote him:

"The ordinary alterative action of this metal, when administered in properly regulated doses, is attended by no especial disturbance of the system. But at times it does not act upon the economy with such tranquility. A febrile condition is not uncommon. At such times the surface becomes warm, the circulation accelerated, the pulse is frequent and jerking, the face is slightly flushed, the nervous impressibility is heightened; in short, there is a general excitement of all the functions. The glandular system is especially acted on; the liver secretes more bile, the salivary glands eliminate more saliva, and in this, as well as in the green discharges from the bowels, the metal may be detected. When mercury is about to spend its force upon the glands of the mouth, the earliest indication of its action is an unpleasant metallic taste, like that of copper or brass. Presently the gums become sore and tender, the mucous membrane is inflamed, the teeth suffer with disagreeable sensations, which are referred to the fangs, and these are raised to actual pain when the jaws are firmly closed. Presently the gums swell and become spongy, then a whitish line is seen along the edge of the teeth, and the peculiar mercurial fetor is developed. The salivary glands are swollen and hot, the jaws stiff and painful. After this condition of things has lasted a short time, a copious flow of saliva takes place. The disease does not always stop here. The cheek is puffed out with a red swelling, which gradually becomes more and more livid, till a gangrene sets in, which sweeps it away, slough after slough laying bare the cavity of the mouth, and hurrying the unhappy sufferer to the grave. Sometimes the ulcerations attack the gums, break them down, seize upon the periosteum, penetrate the bone, which becomes carious and spongy, and finally exfoliates, leaving the most hideous gaps in the face. At other times this ulceration, or gangrene, extends among the soft parts, and opens the blood-vessels, giving rise to the most destructive hemorrhage.

"Nor is its influence confined to the cavity of the mouth. With or without salivation, it exerts the most baneful influence over the economy. At times it acts as a powerful and dangerous sedative. The countenance becomes pale and anxious, the pulse small and frequent. There is much anxiety about the præcordia, and extreme and alarming prostration of strength. At other times an eruption breaks out over the surface, which has been called *hydrargyra eczema mercuriale* and *lepra mercurialis*.

"The most distressing effects it produces, however, are the affections of the nervous system. *These are especially experienced by those who contract the poison by slow and gradual absorption of the metal.* One of the most frequent of these disorders is a form of *paralysis agitans*. The tremors of the limbs are so considerable that the patient is unable to walk without staggering, or to hold anything in his hand. He stammers and finds it

extremely difficult to speak at all. His memory fails him, his intellect becomes weak, and his sight is dimmed. Such phenomena as these are constantly met with among gilders, looking glass makers and workers in quicksilver mines.

"So virulent a poison as this should never, except in cases of the sternest necessity, be introduced into the system, and then it should be done with the greatest care, and so managed that its absorption may be controlled, or that the quantity to be taken in may be regulated. How are these conditions fulfilled when amalgam is introduced into a tooth? Not at all. The secretions of the mouth float around the metal and act upon it. An important part is also played by the other constituents of the filling, which, together with the mercury, form a galvanic apparatus, greatly accelerating the solution of this metal.

"The amalgam question, as it has been called, is thus answered with the utmost promptitude by chemistry. To the chemist it has but one side; it needs but to be stated to be immediately decided upon. The use of a mercurial amalgam is, under all circumstances, wrong; for the simple reason that we have no guarantee that the most frightful results of mercurial poisoning will not take place. * * * That the metal itself is capable of producing these symptoms is a matter of such common place notoriety that the veriest tyro is familiar with it."

I admit that we do not often see cases of severe mercurial poisoning caused by amalgam fillings, but they have occurred, nevertheless, and we cannot know that they will not occur in our patients, for it is a well-established fact, that some persons are peculiarly sensitive to the action of some drugs, so that it is frequently necessary to take into consideration these idiosyncracies when exhibiting medicines. I know a lady who cannot endure the most minute portion of arsenic in a tooth cavity, it producing violent symptoms. Dr. Watt mentions the case of a lady in whom two grains of calomel caused, in a few hours, ptyalism, "in consequence of which she lost her teeth, her jaw exfoliated, and she ultimately, after a succession of ailments, died in about two years."

Taylor's Medical Jurisprudence, article Mercury, says: "Another case was mentioned to me by a pupil, in 1839, in which five grains of calomel killed an adult by producing fatal salivation. In another instance, a little girl, aged five years, took daily, for three days, three grains of mercury and chalk powder; her mouth was severely affected, mortification ensued, and she died in eight days."

These extracts show that the ill effects which sometimes follow immediately from an ordinary dose of mercurial medicine are extreme, even to the taking away of life. It will be readily understood that every less degree of mischief must happen frequently.

The fact that the absorption takes place slowly constitutes the great danger, for it is well known that diseases caused in this way are the most intractible under treatment, and, moreover, the system is attacked so insidiously that the baneful effects are produced before the existence of the danger is known; whereas, if large doses had been given, the *vis naturæ* would have been aroused at once to expel the intruder.

The terrible and obstinate diseases contracted by painters and metal-workers, especially those who have much to do with quicksilver, are brought on in this slow and almost imperceptible manner. If it be objected that the quantity of the poison is so small that it is an absurdity to suppose that serious results can follow its introduction, I think it can be shown that this is not true. It is well known that the majority of homœopathic physicians, a well educated and intelligent class of men, give medicines in quantities so minute that we may almost consider them infinitesimal, and yet appreciable results are produced. I have seen these results follow the administration of the medicine so quickly and so often, that I had no hesitation in referring them to the remedies and not to coincidence. A grain of what is called by homœopathists the third trituration, or attenuation, seems to be an exceedingly small dose, and yet the particles of arsenic in this preparation are shown by the microscope to be as large as the blood corpuscles, and will respond to chemical tests. Statistics show the average success of homœopathists to be equal to that of allopathists, and sometimes greater, as in some of the cholera epidemics. And where is the absurdity of this? We know nothing of the *modus operandi* of medicines; we can only observe the facts and accept the results.

"What is the cause of health? and the gendering of disease?
Why should arsenic kill? And whence is the potency of antidotes?
Behold a morsel—eat and die; the term of thy probation is expired.
Behold a potion—drink and be alive; the limit of thy trial is enlarged."

Is the action of minute portions of medicine more absurd than the force of gravity? "No fact is better established than that the moon is kept in its orbit round the earth, and the earth in its orbit round the sun, by the same force as that which causes a stone or an apple to fall to the ground. These bodies are separated by immense distances; how can they act upon each other? How is it possible for an inert lump of matter to influence another inert lump of matter a hundred millions of miles off? It is by the force of gravitation. But what is gravity, and how does it act? We know not."

Think of the effect of light on the retina of the eye, produced, according to one theory, by minute particles of matter striking directly on the eye, and according to another, by the mere undulatory motion of particles so small that the most powerful microscope cannot reveal their forms to our

vision, while "the length of the undulations of the extreme violet ray is 0.0000167 of an inch, and the number of undulations in a second is 727,000,000,000,000.

A grain of musk may be exposed to the air for very many years, constantly giving forth its fragrant particles, readily perceived by the sense of smell, and yet, at the end of this period, the most delicate balance will fail to detect any diminution of weight. Here is a decided effect produced on the olfactory nerves by particles certainly as nearly infinitesimal as those of the medicine we are considering.

Whose vision is keen enough to perceive the malarious particles which cause intermittent fever, or the tiny atoms which convey an infectious disease from one person to another? No microscope can make them apparent; no chemical test can detect them; yet no one doubts their existence. Their effects cannot be mistaken. The smallest portion of poison from the fangs of some serpents inserted into the skin of an animal will cause almost instant death. I have seen accounts of persons who were severely affected by very minute particles of ipecacuanha. One man, a druggist, after narrating the violent symptoms induced in him, says: "At length I was obliged to quit the shop when ipecacuanha was on hand; indeed, I have frequently entered my own, or the shop of a stranger, long after it had been used, and by the instant recurrence of these very distressing sensations, have been able, too accurately, to ascertain the recent exposure of the drug." Another case was that of a lady, who was always seized with asthma whenever ipecacuanha root was being pounded in the shop. 'Even if she was in the most remote part of the house, the effects were almost immediately felt, and the paroxysm lasted many hours. The wife of a medical man, being near her husband when he was putting some ipecacuanha into a bottle, had so violent an attack of asthma that she nearly lost her life. She was affected with stricture about the throat and chest, with very troublesome shortness of breathing and wheezing, gasping for breath, deathy paleness, almost imperceptible pulse, and great danger of suffocation. She became easier from about 11 A. M. till about 11 P. M. The same scene was continued eight days and nights successively.

I think I have shown that some persons are remarkably sensitive to the action of some drugs, mercury among the number; that there is peculiar danger in the slow and long-continued absorption of poisons; that very minute portions of medicine may produce very serious results, and that this being the case, an amalgam filling is a thing "most intolerable, and not to be endured." If I have not made this clear, I think it must be because there is nothing which cannot, by an ill way of telling it, be made to appear evil.

With this view of the matter, what right have we to place amalgam in

the mouth of any one? None at all. We have no guarantee that very serious results will not follow. We are tampering with the health of our patients, and that we have no right to do; as on a man's health depends perhaps the happiness, certainly the comfort of his life. Iago might have said of his health as he did of his reputation: "Who steals my purse, steals trash; but he that filches from me my good name, robs me of that which not enriches him, and makes me poor indeed." Amalgam steals away not only the health of patients, but the reputation of many a dentist. Health is, indeed, a jewel, a pearl without price, a possession of inestimable value, whose presence may make a paradise of earth, whose loss may make the world seem hell and mankind devils. Certainly, the unfortunate sick man often acts as if possessed by a fiend, although I do not agree with Carlyle, I think it is, who asserts that all invalids are rascals, or something to that effect. Yet on health depends not only the well-being of individuals, but even the prosperity of nations.

Health, eldest born of all
  The blessed ones that be,
Through life's remainder, howe'er small,
  Still may I dwell with thee!
    And thou with me,
    A willing guest,
    Oh, take thy rest!
For all man hath on earth, blest health—
Each nobler gift, as children, wealth,
The bliss of kingly government,
With that desiring uncontent,
We fain would seek, we fain would move
In th' undiscovered toils of love;
These, or each other utmost pleasure
Man hath from heaven his dearest treasure,
    And amid all his earthly moil,
    The sweet forgetfulness of toil;
With thee, blest health, health ever young!
With thee they grew, from thee they sprung;
Spring of all gifts from heaven that fall,
Thou art the sunshine of them all!
    Yet all are turned to misery
    For him that lives bereft of thee.

(TO BE CONTINUED.)

ON PRESERVATION OF THE DENTAL PULP.

BY DR. ARTHUR FORD.

I have been much interested in reading the proceedings of the Pennsylvania Association of Dental Surgeons, in the January number of the DENTAL TIMES, especially the discussions and experiences in regard to the application of "oxychloride of zinc" for capping exposed nerves. I have used this capping extensively myself during the past two years, and will give my experience with regard to my success.

I would premise by saying that I am a great advocate for preserving the vitality of every tooth wherein I have a shadow of a chance to be successful; but until the introduction of the use of oxychloride of zinc, I must confess I had but ill success, but since, I have been remarkably for-

tunate; indeed, out of many cases, I know of but one that failed, and that was under very disadvantageous circumstances. I do not know whether my manner of manipulating may be the same as most others, so will give it somewhat "in extenso."

First, I excavate the cavity perfectly, taking care not to touch the exposed nerve more than possible, then dry the cavity as much as practicable, without producing too great pain to the patient, and protect the tooth against all moisture; moisten a small mop of cotton with creasote, and wipe out the cavity carefully, but thoroughly, and having previously placed the chloride and muriate of zinc (separately) on a piece of glass on my stand ready, mix them to the consistency of putty, (or nearly so,) keep the mouth open with the left hand, guarding the cavity most jealously against moisture. I then fill the entire cavity, and still keep the mouth open some five to ten minutes; then warming some wax, cover the filling entirely with it, the object of which is to keep the oxychloride as long as possible from becoming very wet, and dismiss my patient for a week or two, at the expiration of which time I remove about two-thirds of the oxychloride, filling thoroughly with gold, or, in some molar cases, amalgam. This has been my uniform mode of treatment in such cases, and am happy to say have been eminently successful. I have three special cases under my eye for constant inspection, one filled about eighteen months since, another about a year, and the third about a month, none of which have given the least trouble since the introduction of the oxychloride, at which time there was, of course, some pain, though of short duration, nor can I discover any indication of decreased vitality. I am so well satisfied with this mode of treatment, that I firmly believe it is the only true way in which a pulp can be capped with any certainty of success.

I perceive also in the proceedings of said Association, that Dr. Huey asks the members for instruction with regard to a "pulp that resisted all attempts to destroy it by arsenical paste." My impression in such cases is, that the pulp is already partially devitalized, and, as a sequence, the absorbents inert, and therefore the energies of the parts are entirely paralyzed. In such cases first remove all the devitalized portion of pulp, or as much as possible without inciting too much pain to the patient, and then apply the paste, and I have never found a case that resisted such treatment. My partner had a case in point lately: he had made five or six ineffectual applications, when one day, during his absence, the patient happened in, and I examined the case. It was the left inferior first molar. I removed all the carious dentine, and nearly the whole of the pulp, without pain, but beyond that point the pulp was of full vitality. I then applied the paste, and in twelve hours after it was

effectually destroyed; that is, to within about a line of the apex of the fang. The tooth was then treated and filled in the usual way, without further trouble.

I do not know that I have advanced any new idea or mode of treatment; on the first subject I only desire to add my evidences of success and approbation of the system of treatment to those expressed by the eminent gentlemen of the Association; and on the latter, seeing no mode of operation promulgated, I humbly offered mine in lieu of a better.

ATLANTA, GEORGIA.

Dental Associations.

THE FOURTEENTH ANNUAL COMMENCEMENT OF THE PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The Fourteenth Annual Commencement of this College was held on Saturday evening, February 26th, and, as usual, a very large audience assembled to witness the interesting exercises—many obtaining standing room only. The pleasure of those present was much increased by the performance of choice selections of music by the Germania Orchestra.

The opening prayer was offered by the Rev. Dr. Bomberger, after which the Degree of Doctor of Dental Surgery was conferred upon the following members of the class, by Henry C. Carey, President of the Board of Trustees:

GRADUATES, 1869-'70.

J. Fred. Babcock, Maine,..........Morbid Effects of First Dentition.
Charles H. Bagley, Pa.,..............Amalgam.
Edward F. Barnes, Mass.,..........The Dental Pulp.
Henry E. Beach, Va.,..................Inflammation.
Francisco E. Brunet, Cuba,........Stomatitis.
George T. Carpenter, Ill.,...........Caries of the Human Teeth.
Charles P. Coffee, Ohio...............Dental Caries and their Treatment.
Frank L. De Gour, Pa.,...............Science and Medical Culture.
E. Rubio y Diaz, M. D., Cuba,...Influence of Syphilis upon Diseases of the Mouth.
Charles E. Edwards, Pa.,............Caries.
Thomas H. Gilpin, Md.,.............Development of the Teeth.
Augustus V. Hartlevan, Pa.,......Vulcanite Base.
Ferdinand Hasbrouck, Pa.,........Nitrous Oxide.
John Hellings, Pa.,.....................Cleft Palate.
W. H. I. Hilliard, N. J.,............Disease of Maxillary Sinus.
Louis G. Houard, Cuba,.............The Affections of Superior Maxillary Bone.
Samuel F. Howland, Mass.,........Preservation of the Teeth.
Jay H. Johnston, Pa.,........ ....Extraction of Human Teeth.
George W. Klump, Pa.................Facial Neuralgia.
O. L. de Lalande, M.D., France,...Mercurial Stomatitis.
Jonathan T. Leet, Pa.,................Caries of Human Teeth.
William A. Marler, N. C.,..........The Dental Profession.
J. Henry Mease, Pa.,...................Fracture.
Charles W. Meloney, Del.,.........Digestion.
Gustavus J. R. Miller, Pa.,........Operative Dentistry.
Jose M. Portuondo, Cuba,..........Affections of the Gums.

Alfred Reaud, France,	Sketches on Dentistry.
Augustus J. Rederich, Iowa,	Treatment and Filling over Exposed Pulps.
Granville L. Robb, Pa.,	Antrum of Highmore and its Diseases.
Charles H. Scott, Ohio,	Dental Prosthesis.
John Sheldon, N. Y.,	Dental Hygiene.
Melville C. Sim, Ohio,	Neuralgia.
George W. Smith, Pa.,	Operative Dentistry.
James G. Templeton, Pa.,	Operative Dentistry.
James T. Turner, Md.,	Extraction.
Charles Tyson, Pa.,	Mechanism of the Human Skeleton.
John D. Ware, N. J.,	Dental Caries and their Treatment.
M. Milnor Worrall, Pa.,	Nitrous Oxide.
*Seneca B. Brown,	Indiana.
*H. H. Martin,	Pennsylvania.
*J. B. Prescott,	New Hampshire.
Total,	41

The following is a list of the matriculants for the present session, comprising, in all, eighty-three students:

MATRICULANTS—FOURTEENTH ANNUAL SESSION, 1869-'70.

MATRICULANTS.	RESIDENCE.	PRECEPTORS.
A. B. Abell, Jr.,	Pennsylvania,	Dr. A. M. Asay.
William B. Antrim,	Pennsylvania,	Dr. S. K. Screven.
J. Fred. Babcock,	Maine,	Dr. E. T. Wasgatt.
Charles H. Bagley,	Pennsylvania,	Dr. A. B. Robbins.
E. F. Barnes,	Massachusetts,	Dr. A. F. Davenport.
J. C. Barnum,	New York,	Dr. Barnum.
Henry E. Beach,	Virginia,	Dr. T. N. Reid.
Eligio Brunet,	Cuba,	
Seneca B. Brown,	Indiana,	
Eduardo Brunet,	Cuba,	Dr. G. T. Barker.
H. W. Buchanan,	Pennsylvania,	Dr. E. J. Greene.
Frank E. Brunet,	Cuba,	Dr. G. T. Barker.
Charles C. Cannon,	Massachusetts,	
George T. Carpenter,	Illinois,	Dr. B. M. Baker.
Charles E. Caufman,	Pennsylvania,	Dr. C. Sheafer.
C. P. Coffee,	Ohio,	Dr. J. C. Whinery.
Joseph Coombs,	Pennsylvania,	Dr. S. W. Merrick.
Edmund Coquard,	Michigan,	Dr. Cowie.
F. L. De Gour,	Pennsylvania,	Dr. J. Truman.
O. Labadie De Lalande, M.D.,	France,	Dr. O'Callaghan.
T. W. Dobbins,	New Jersey,	Dr. C. S. Stockton.
Charles E. Edwards,	Pennsylvania,	Dr. Wm. Eastlack.
George R. England,	Pennsylvania,	Dr. D. Roberts.
Pedro F. Fernandez,	Cuba,	
Jose Garcia,	Porto Rico,	
Joseph H. Graham,	Pennsylvania,	Dr. T. L. Buckingham.
J. Q. Garset,	Cuba,	Dr. John.
H. C. Gilchrest,	New York,	Dr. George Wright.
Thomas H. Gilpin,	Maryland,	Dr. T. H. Musgrove.
A. V. Hartlevan,	Pennsylvania,	Dr. J. M. Davis.
F. Hasbrouck,	Pennsylvania,	Dr. John Allen.
John Hellings,	Pennsylvania,	Dr. McFarlan.
W. H. I. Hilliard,	New Jersey,	Dr. C. S. Stockton.
L. G. Houard,	Cuba,	Dr. Barker.
S. F. Howland,	Massachusetts,	Dr. A. A. Howland.
H. Hudson,	Pennsylvania,	Dr. Belknap.
E. T. Hutchinson,	Illinois,	Dr. E. Stevens.

* Having been in practice since 1852, and complied with 2d Article on "Qualifications for Graduates."

MATRICULANTS.	RESIDENCE.	PRECEPTORS.
J. R. Jackson,	Delaware,	Dr. G. Spencer.
J. H. Johnston,	Pennsylvania,	Dr. Yost.
S. A. Keltner,	Ohio,	Dr. J. Carr.
G. W. Klump,	Pennsylvania,	Dr. L. Eveland.
J. T. Leet,	Pennsylvania,	Dr. J. Rohrer.
E. H. Leffler,	Pennsylvania,	Dr. S. H. Whitmer.
Arthur Legorburu,	Cuba,	Dr. L. J. Martin.
A. Lezama,	Cuba,	
Clarence L. Lindsley,	Michigan,	Dr. T. Parkman.
Thomas Linn,	Pennsylvania,	Dr. G. Rauch.
W. A. Marler,	North Carolina,	Dr. J. W. Hunter.
H. H. Martin,	Pennsylvania,	
J. H. Mease,	Pennsylvania,	Dr. S. H. Gilford.
Charles W. Meloney,	Delaware,	Dr. W. G. A. Bonville.
G. J. Miller,	Pennsylvania,	Dr. John Heiss.
S. M. Moore,	Pennsylvania,	Dr. G. T. Barker.
G. B. Newland,	Pennsylvania,	Dr. W. Newland.
Robert F. Philips,	Florida,	Dr. Asa Hill.
J. B. Prescott,	New Hampshire,	Dr. T. Buckminster.
Jose M. Portuondo,	Cuba,	Dr. J. Truman.
John W. Ramsden,	Pennsylvania,	
Alfred Reaud,	France,	Dr. O'Callaghan.
C. I. Reese,	Pennsylvania,	Dr. R. McKissick.
A. J. Rederich,	Iowa,	Dr. M. L. Pierce.
G. A. Reid,	Ontario,	
G. L. Robb,	Pennsylvania,	Dr. R. A. Miller.
Enrique Rubio, M. D.,	Cuba,	Dr. O'Callaghan.
Charles H. Scott,	Ohio,	Dr. H. Morrison.
John Sheldon,	New York,	
H. R. Sheldon,	New York,	Dr. John Sheldon.
M. C. Sim,	Ohio,	Dr. M. Keyser.
G. W. Smith,	Pennsylvania,	Dr. J. G. Camp.
M. C. Steeves,	New Brunswick,	J. E. Griffith.
L. A. Stephenson,	Mississippi,	Dr. B. W. Ross.
A. M. Stewart,	Pennsylvania,	
James M. Stewart,	Pennsylvania,	Dr. M. Logan.
J. G. Templeton,	Pennsylvania,	
R. F. Tull,	Maryland,	Dr. Thos. H. Musgrove.
J. T. Turner,	Pennsylvania,	A. P. Fields.
Charles Tyson,	Pennsylvania,	Dr. J. Truman.
J. V. Valdes,	Cuba,	
John D. Ware,	New Jersey,	Dr. E. Chew.
W. R. White,	Pennsylvania,	Dr. W. R. White.
M. M. Worrall,	Pennsylvania,	Dr. E. Penn Worrall.
James Wright,	Pennsylvania,	
S. Zimmerman,	Canada,	Dr. J. Zimmerman.

The reports of both the Operative and Mechanical Departments are also presented. A careful consideration of these reports, exhibiting the amount of work *performed entirely by the students*, must convince every one of the immense advantage of collegiate and clinical instruction.

DEMONSTRATOR'S REPORT, SESSION OF 1869–'70.

OPERATIVE DEPARTMENT.

Number of Patients visiting the Clinic,	3347
Gold Fillings,	1361
Tin Fillings,	669

Amalgam Fillings,	54
Wood's Metal Fillings,	4
Hill's Stopping,	120
Oxy-Chloride of Zinc,	81
Superficial Caries Removed,	57
Treatment of Pulp and Filling Pulp Cavities,	339
" Periodontitis,	35
" Alveolar Abscess,	72
" Inflammation of Gums,	43
" Partial Necrosis of Bone,	5
Bleaching Teeth,	3
Removal of Salivary Calculi,	224
Pivot Teeth Inserted,	5
Extraction of Teeth and Roots,	3692
Total,	6764

ELIHU R. PETTIT, Demonstrator.

MECHANICAL DEPARTMENT.

124 patients were supplied with the following Artificial Dentures;

Full Upper and Under Sets,		33
Full Upper Sets,		47
Full Under Sets,		8
Partial Upper Sets,		37
Partial Lower Sets,		5
Obturator,		1
Teeth Mounted on Silver Base,		1019
" " Weston's Metal Base,		56
" " Hard Rubber Base,		912
" " Continuous Gum,		14
Whole number of Gum Teeth inserted,	1824	
" " Plain " "	177	
" " Teeth Mounted for Patients,		2001

DEPOSITING CASES.

27 Full Upper Sets on Metal Base, number of Teeth,	378	
1 Full Under Set on " " " "	14	
4 Partial Upper Sets, " " " "	30	
4 Full Upper Sets on Hard Rubber Base, number of Teeth,	56	
2 Partial Sets on " " " "	9	
2 Full Upper Sets on Continuous Gum, " "	28	
1 Full Set on Porcelain Base, " "	14	
2 Obturators.		
Number of Gum Teeth,	529	
Number of Teeth on Depositing Cases,		529
Total number of Teeth Mounted during Session,		2530

J. M. BARSTOW, Demonstrator.

The Valedictory Address was delivered by James Truman, D. D. S., Professor of Dental Histology and Operative Dentistry, and was listened to with marked attention. This was followed by the distribution of bouquets to the graduates, who seemed to appreciate fully the favor of their lady friends as expressed in those beautiful gifts. The exercises closed with the benediction.

Editorial.

THE CAUSE OF THE DELAY.

In consequence of certain changes in the Faculty of our College, and consequently in the editorship of this journal, it became necessary to withhold the publication of the April number of the Dental Times until the present time. The changes to which we refer are as follows: Prof. William S. Forbes resigns the chair of anatomy and surgery, and F. Ewing Mears, M. D., has been appointed to succeed him. The last named gentleman is well known as a lecturer and teacher, and brings to the chair a well furnished mind, with no lack of industry and energy. We are also pleased to announce the election of James Tyson, M. D., to the vacant chair of physiology, formerly filled by Henry Hartshorne, M. D. The unequalled success of Dr. Tyson as a teacher and microscopist is well known to our late class who had the past session the benefit of his lectures. We believe these changes will conduce to the best interests of the dental students in attendance, and to the prosperity and welfare of the College.

G. T. B.

☞ Our next number will contain a full account of the formation of the Association of the Alumni of the Pennsylvania College of Dental Surgery, of which Prof. James Truman is President, Dr. E. R. Pettit, Secretary.

Delayed Articles.—In consequence of a press of matter, several articles are necessarily delayed until the July number.

Correspondence.

THE STATE DENTAL SOCIETY.

The State Dental Society, of Pennsylvania, will hold its second annual meeting, in the City of Pittsburg, on the third Tuesday of June, (21st inst.,) to continue three days.

All necessary arrangements have been made by the Executive Committee, for the comfort and accommodation of the members and delegates at the *Monongahela House*. It is hoped that there will be a full attendance, as the members of the profession of Pittsburg extend a cordial greeting to the members and delegates of the State Society, and are anxious and willing to do all in their power for their entertainment and comfort.

Arrangements will also be made with the railroad companies, leading to that city, to have the fare reduced to excursion rates.

The subjects of the essays for discussion have not yet been communicated to the undersigned; but notice of the same will be given in due time in the dental periodicals. S. WELCHENS, D. D. S., Cor. Sec., Lancaster, Pa.

Book Notices.

The Cell Doctrine, its History and Present State, for the use of Students in Medicine and Dentistry. Also, a Copious Bibliography of the Subject. By JAMES TYSON, M. D., Lecturer on Microscopy in the University of Pennsylvania, and on Physiology in the Pennsylvania College of Dental Surgery, Fellow of the College of Physicians of Philadelphia, &c. Lindsay & Blakiston, Philadelphia.

Since the issue of Dr. Beale's work, on "The Structure of the Simple Tissues of the Human Body," in 1861, so much interest has been manifested in the subject by our leading educators, and so many inquiries have been received for a volume adapted to the ordinary purposes of class instruction in our colleges, that the author has prepared this creditable work to answer that demand. He modestly tells us in his preface, that he "has become convinced, by several years' intercourse with students of medicine, that their acquaintance with the subjects he has endeavored to include in this little volume would be facilitated if the views which are now taught and scattered throughout the often expensive works of their authors were collected in a convenient form for study and reference. Taking it for granted that a knowledge of this subject is of fundamental importance in its bearing upon the study of physiology and pathology, he has sought to obtain a continuous history of the evolution of the "Cell Doctrine," up to its present state, without embarrassing his pages with a large number of isolated facts. He has attempted, however, to secure a completeness, and to make the work useful to physicians and others engaged in research, by careful references and the addition of a bibliography, which he has sought to make accurate and extended." The author, in the preliminary chapter of his work, refers to the early ideas of the minute structures of animals and vegetables, and shows how the introduction of the compound microscope influenced and developed histological research. The labors of Borellus, Swammerdam, Malpighi, Hooke and Leeuwenhoek are adverted to, while to Haller is the credit given of conceiving that tissues are built by an ultimate physical element, corresponding with the "atom" of the inorganic chemist. The doctrines of

Wolfe, Prochaska, Bauer and Milne Edwards, and their cotemporaries, receive appropriate mention, and the author carries us on to the "master stroke, in observation and generalization," viz: the observations of Schleiden and Schwann. The investigations of these histologists are noticed in an extended manner, their views fully elaborated, and the influence which their investigations had upon succeeding observers is ably demonstrated.

The above remarks will hold good upon the review of the labors of Barry, 1840; Henle, 1841; Goodsir, 1845; Huxley, 1853; Bennett, 1855; Todd and Bowman, 1856; Virchow, 1858: Max Schultze, 1861; and Dr. Beale, 1861. In the resume of the works of each of the above named authors, the writer proves to be possessed of that rare gift of selecting the very *essential portions* of their labors, and of collating and presenting them to the reader in a brief and concise manner. The whole work, indeed, bears evidence of laborious investigation, and of careful and severe study, while the numerous foot notes and copious bibliography make it of real value to the student and investigator. We give the author's views, which we commend for clearness and brevity.

As the result of a careful comparison of the views of other observers, and of personal observation, extending over a period of several years, chiefly in the direction of human physiology and pathology, the author has been led to adopt views, which, in the main, correspond with those of Dr. Beale. There are, however, a few points of difference; some, perhaps, purely in mode of expression, but others as to matter of fact, which would seem to be appropriately here recorded. And, in order to give completeness to any expression of such views, he has thought best to state them connectedly, though briefly.

The author believes the ultimate physical element of organization, to be what is commonly called the "cell," or "elementary part," and that it is composed of matter in two states. The one, central in its situation, to which Dr. Beale has most appropriately given the name "germinal matter;" the other, for the most part peripheral in its situation, which the same observer has called "formed matter." The former, which is the "sarcode" of Dujardin, the "protoplasm" of Max Schultze, is that upon which the *origin* and *existence* of the cells depends. It is derived by division, budding or proliferation from previously existing matter of the same kind, and it alone has the power of growing by converting nutritious matter or "pabulum," derived from the blood or other sources, into material like itself. Without germinal matter, textures cannot be reproduced or continued.

In appearance, germinal matter is *often* structureless, especially as constituting the living moving matter of the protozoa or lowest animals of the rhizopod type, as the amœba. Yet it is not always structureless, but often *granular* in its appearance, and as constituting the mass of rapidly growing cells in health and disease, in the higher animals, is indeed *usually* granular, as is evident from the study of pus, or mucus, or white blood corpuscles, or the cells of a rapidly growing morbid growth. Indeed, it seems like sacrificing observation to theory, to say that germinal matter is always structureless. For let us take the white blood corpuscle or pus corpuscle, acknowledged to be pure germinal matter, and always described as granular in its structure; either the germinal matter here is granular, or the granules are particles of formed material or extraneous matter suspended in the formless substance, just as granular matter from without becomes entangled in the formless matter of the amœba. But, such a view as the latter, would be incompatible both with the behavior of growing germinal matter, and the reaction by which it is known; for we note, on the one hand, that when germinal matter grows rapidly, these granules are the elements which increase most abundantly; and again, that these are the portions most deeply stained by ammoniacal solutions of carmine or aqueous solutions of red aniline. Especially must this be the case if the so-called nuclei of these bodies, which appear after the addition of water and acetic acid, are simple aggregations of the granular matter, as is contended by Dr. Beale. We deem it incorrect, therefore, to describe germinal matter as in all instances structureless, and prefer, with Robin, to describe it as sometimes granular. Indeed, if we mistake not, Dr. Beale in his earlier descriptions also characterized it as granular.*

A circumscribed round or oval portion of germinal matter within the cell is usually termed the *nucleus*, which may be surrounded by formed material as in the superficial epithelial cell, or by other germinal matter as in the white blood corpuscle.

In the *nutrition* of the cell, the pabulum comes to it from the periphery; being strained through the formed material, and the new germinal matter takes its place in or near the centre of the original mass, constituting a new centre of germinal matter, which may be the

* Beale's Archives of Medicine, vol. ii, p. 189.

nucleus, if no other circumscribed centre be present, or the *nucleolus* if it be deposited within such a centre. Other new centres may again take position within these, and assume the relation of nucleolus to the original nucleolus, which now becomes a nucleus, an older centre of germinal matter; while the original nucleus has probably been converted into the second constituent of the cell, the formed material.

Germinal matter when free and living, exhibits a power of movement, both in *portions* of its substance, producing changes in shape, and in its *entire mass*, resulting in changes of position. The former, and probably, also, the latter, may have for their object the obtaining of pabulum, as is seen in the amœba, when it embraces by its protrusions a particle of nutritive matter. These movements are less decided in the cells of the higher animals, yet they are of constant occurrence, as in pus and white corpuscles, and when thus occurring they are spoken of as "amœboid movements." Allied or identical with this second class of movements, are those of undoubted occurrence, in which white blood corpuscles have been noted by Addison,* Waller,† and Cohnheim,‡ migrating from the blood-vessels, and constituting *one* method of origin of pus.

Formed Material, or Non-Germinal Matter.—As the result of influences, the exact nature of which is not known, though some of them may partake of the character of oxidations, the germinal matter is converted into the second constituent of the cell, *formed material*. This formed material, peripheral, for the most part in its situation, and constituting the cell wall when present, is without the property of germinating, or multiplying itself, or even maintaining itself. Yet it is exceedingly important, and as essential indeed to the functions of the economy, as the germinal matter. It is, in fact, the portion of the cell in which alone function resides, since it is to the formed material of the muscle-cell that we owe the property of contractility, to the formed material of the nervous element that we are indebted for neurility, and to the formed matter of the epithelial cell that we owe its protective qualities; while the secretion of all glands, whether they subserve ulterior purposes or not, is the formed material of the respective gland-cells. Hence, we would not in every instance speak of the formed material as dead, where it is the seat of so many important vital endowments, as in muscle and nerve. In some situations, it is indeed lifeless, as when it becomes the secretion of glands, as bile and milk, or the peripheral part of epithelial cells. It simply is devoid of a power of multiplying or growing by itself, depending for its increase upon the conversion of the germinal matter. Hence we have been inclined to suggest the term "non-germinal," or "non-germinating" matter, since this is the only attribute common to all formed material.

In *structure*, formed material or non-germinal matter is varied. Thus, it is typically without structure in the red blood disc; again, it exhibits distinctive structure in the striped sarcous matter of muscle, and in the fibrous intercellular substance of white fibrous tissue or fibro-cartilage.

As formed material is produced on the periphery of germinal matter, previously existing formed material is pushed outward, so that the oldest formed material is that most remote from the germinal matter, and the youngest lies immediately adjacent to it.

Intercellular substance, whether of cartilage or white fibrous tissue, is formed material, resulting from the conversion of the germinal matter, which constitutes the cartilage corpuscle on the one hand, or the connective tissue corpuscle on the other. It is not of the nature of a deposit from the blood-vessels which subsequently becomes differentiated. Young cartilage cells, like all young cells, consist of almost pure germinal matter, and the capsule of the cartilage corpuscle is but formed material, more or less continuous and inseparable from the intercellular substance; so that we would, with Beale, define a cartilage cell, or elementary part of cartilage as composed of germinal matter, with as much surrounding formed material as extends half way to the adjacent germinal matter. So with the elementary part of connective tissue, muscle, and nerve.

Oil and starch are also formed matter, conveniently designated by Dr. Beale as *secondary* formed matter, and result, also, from a conversion of the germinal matter.

As already stated, the proportion in which these two constituents are present, is various. Thus, in the amœba, in the white blood disc, in the pus and mucous corpuscle, we have almost pure germinal matter, with a scarcely appreciable ring of formed matter on its periphery; while in the old epithelial cell we have almost pure formed material with a mere point of germinal matter, constituting the nucleus near its centre; and in the red blood disc, we have pure structureless formed matter, yet matter of which we should long hesitate to speak as dead. In old tendon, again, the proportion of formed material is large, and germinal matter small, while in young tendon the reverse proportion exists.

The *cell*, as thus constituted, and originating only in the germinal matter of a previously existing cell, we believe to be *the starting-point of all life action, be it healthy or morbid*. Out of this cell, all tissues, simple and complex, are constructed.

We believe, also, that the proper shaping, arrangement, and function of these elementary parts is not a process identical or analogous to crystallization, taking place through merely physical laws, but that there is a presiding agency which controls such arrangement to a definite end. It matters not what this is called, but we prefer to designate it at present by the term "vital force," or "vitality." It is this controlling agency which makes all so-called vital properties essentially different from purely physical properties, a difference which, though it be denied in *words*, and explained away by reasoning, has the most decided proof of its existence in the acknowledgment it receives in the *actions* of men, just as the most convincing argument in favor of the free agency of the human mind is seen in the fact, that all men shape their actions on the supposition of such a freedom, whatever their pretended belief with regard to it.

That there is something in this force or power over and above the physical forces of nature, is most strikingly shown in the power, exhibited through its agency by germinal matter, of multiplying and producing new germinal matter out of pabulum unlike itself. For although a crystal may result from the rearrangement of particles of a salt in solution, as sulphate of alumina, to an unlimited extent, there is no possibility, nor would any physicist contend

* Addison. Physiological Researches. London, 1841.
† Waller. London. Dublin and Edinburgh Philosophical Magazine. vol. xxix, p. 271, 1846.
‡ Cohnheim. Ueber Entzundeng und Eiterung. Virch. Arch. Bd. xl, p. 48.

that it could produce crystals, of its own composition, out of carbonate of soda. Nor, as is justly contended by Dr. Beale, should the cell be compared to a machine, unless that machine possess a power of producing new machines out of material unlike itself, and of endowing them with a similar power.

In *morbid processes*, also, the germinal matter is the seat of activity, being abnormally increased, diminished, or perverted; and many pathological states are rationally explained by bearing in mind the properties of germinal matter and the very minute size which the living particles may exhibit. All physical difficulties in the way of the passage of white blood corpuscles through the walls of capillaries are removed, when we remember that the smallest living particles by the rapid growth of which white blood discs or pus corpuscles are speedily produced, do not exceed the 1-100000 of an inch in diameter, and that however unreasonable it may appear for a body 1-3000 of an inch in diameter to migrate through continuous capillary walls, it becomes much less unreasonable when we thus reduce its proportions. The observations of Beale would also seem to reconcile the discordant views with regard to the so-called *exudations*, in which on the one hand we need not suppose an excessive dislocation of structure to admit the passage of large cells, and on the other are not compelled to restrict the origin of those cells to points outside the vessels. We have already expressed that the views of H. Charlton Bastian and Cornil, with regard to the origin of tubercle in the perivascular sheaths of vessels, are not practically different from those earlier expressed by Beale as to its origin in the germinal matter of the walls of blood-vessels.

It will be noted that the only points of difference between our own and the views of Dr. Beale, lie in the *structure* of the germinal matter, and the use of the word *dead* to characterize formed material. In all other respects, we accept the theory of Beale, and have no hesitation in saying that it admits, without distortion of its own principle or disregard of actual facts, of consistent application to a larger number of processes of tissue-building in health and disease, than any other theory proposed.

In conclusion, then, it may be stated, 1st, that the "cell," or "elementary part," originating only in a pre-existing cell, is the ultimate morphological element of the tissue of animals and plants.

2d. That the cell, contrary to the belief of the earlier histologists, and, indeed, many later observers, is *rarely vesicular* in its structure, but generally more or less solid throughout.

3d. That the cell is composed of "germinal" or living matter which is central, and includes "nucleus," "endoplast," "protoplasm" and "sarcode;" and of "non-germinal," or "formed" matter, which is peripheral, and corresponds with "cell wall" and "intercellular substance."

4th. That this germinal matter of the cell in a part or all of its substance, may assume a special morphological state, usually round or oval, commonly known as the "nucleus" of the cell, which, when present, is always a young centre of germinal matter; but that in other instances both animal and vegetable cells may be complete without this special form of germinal matter or "nucleus," as in the non-nucleated amœbæ and protogenes primordialis of Hæckel, the non-nucleated monads of Cienkowsky, and in the leaf of Sphagnum, in such Algæ as Hydrodictyon, Vaucheria and Caulerpa, and in young germinating ferns.

5th. That in consequence of these facts, it cannot be said that in the nucleus alone resides the power to reproduce the cell, since we find the nucleus not essential, but that in the germinal matter, of which, after all, the nucleus, when present, is but a part, resides this function.

6th. That when the smaller body within the nucleus, usually known as the "nucleolus," is present, as it often is in complete cells, it is simply a younger centre of germinal matter than is the nucleus itself, and is the last formed portion of germinal matter, instead of being the oldest part of the cell, as originally taught by Schleiden and Schwann. And thus, according to the latest views, the whole process is reversed. The old order of succession being, 1st. The "nucleolus;" 2d. About this the "nucleus;" and finally about this the "cell wall," which embraces the cell contents. Now, however, what constitutes the "cell wall" when present, is the oldest part of the cell; next in age are the so-called "cell contents," whether germinal matter or not; next the "nucleus," and last and youngest the "nucleolus."

7th. That the formed material constituting the cell wall and intercellular substance may be something chemically different from the germinal matter, or protoplasm whence it was converted, as the secretions of gland-cells, or may be a simple condensation of the exterior of the cell, as in the red blood disc.

8th. That the so-called "free nuclei," so often referred to by pathologists in their descriptions of minute structures, are simply masses of germinal matter, smaller than those to which the name cell is usually given, which, if time be permitted, will pass into perfect cells by the usual production of formed matter on their periphery: that they do not originate spontaneously, but from previously existing germinal matter. So, too, "granules," if they be composed of germinal matter, present the same attributes and endowments, arising from previously existing germinal matter, capable of growing, multiplying, and assuming all the characters of fully formed cells, but never originating spontaneously. Granules otherwise composed are *histolytic* and *not histogenetic*,—that is, they result from the breaking down of tissue rather than go to building it up.

The work is handsomely illustrated, with a colored plate illustrative of Dr. Beale's views, and numerous illustrations. The typography and appearance of the work reflect credit upon the publishers. We heartily commend it to the medical and dental public.

Transactions of the American Dental Association. Ninth Annual Meeting, August 3 to 6, inclusive, 1869.

The committee in charge of the publication of the transactions deserve credit for the promptness and good style which the work presents; besides the minutes of the meeting, it contains valuable essays and reports, by Drs. Atkinson, Ambler, Butler, Allen, Palmer and Dean. The discussions, ably reported by Dr. W. C. Horne, are full of instruction. The interest manifested in the subjects considered is an evidence of dental progress. It is on sale at the different dental depots.

On the Relations which Dental Caries (as Discovered Amongst the Ancient Inhabitants of Britain, and amongst Existing Aboriginal Races,) may be supposed to hold to their Food and Social Condition. By John R. Mummery, F. L. S., L. D. S., Vice-President of the Odontological Society of Great Britain.

This little work was received too late for review, but from a hasty perusal of its contents the author would seem to have presented an exhaustive treatise on the subject considered. G. T. B.

Selections.

We think the following equal to the best efforts of "Fanny Fern."

G. T. B.

IN THE DENTIST'S CHAIR.

BY "ONE WHO HAS BEEN THERE."

If there is any place which, more than another, shows what people are made of, it is this particular one. We flatter ourselves that we are made of "sterner stuff" than to shrink at any misfortune; but, alas, we find that so far from having any back-bone, "we are such stuff as dreams are made of, and our little life is rounded"—no, jagged, by the *toothache.*

These are the times that try men's souls, aye, and women's too, tries them and finds them wanting; shows us so plainly, that a wayfaring man, though a fool, need not err therein, the world-wide difference between actual and imaginary bravery.

Where is that heroic courage, which we fancy ourselves to possess, as we follow some hero through deeds of daring? Fired with enthusiasm, we picture ourselves standing on picket duty in the midnight gloom of a forest, or rushing to the "imminent deadly breach." It is sweet to die in a noble cause, and we see ourselves falling with dignity, amid the tears of our admiring and bereaved friends.

But let this lofty soul feel the tingling of a little, miserable, comtemptible bit of an end of a tangle of sensation, called a nerve—a bit not more than a half inch long, and say a hair's breadth in thickness—and how it does take the nonsense out of one. Brave! Of course I'm brave, if I'm not going to be hurt. Fortitude! I've as much as other people if there's nothing to bear. Why I have stood and looked on with perfect

composure while my dearest friends have had their teeth pulled; but it does make all the difference in the world as to which is getting hurt.

But you screw up that most slippery article, your courage, till you think you have it at the sticking place. For weeks you say to yourself, "Well, I really ought to go to the dentist's." Then your virtuous resolution rises a notch higher, and you determine to go; and you hug yourself in admiration of so much bravery and don't go, satisfied to let the matter rest there till some worse twinge than ordinary carries you bodily to the office, and there you are, fairly in his clutches, and not to be released till you have paid to the uttermost in suffering.

Such is the hardness of the human heart, that the dentist actually meets you smiling, he will rub his hands and say, "It's a fine morning," or some other heedless speech. Dentists ought to be reformed. They should be solemn and sympathizing as undertakers. Hung be the heavens with black, when I am compelled to approach their hearts, and I would have them attired in funereal suits; let them also have a white handkerchief with a deep border, (possibly, mourning on the edge,) visible from the pocket, and let them pull it out and drop a tear or two when their patient's sufferings become too affecting. But as the world is now, we have mourned unto them and they have *not lamented.* They smile at your agony and have you into the chair. There you are, and your soul sinks into your very boot-heels. You desire to retain some vestige of self-respect, and your friends have thought you to possess a strong will, otherwise, no power on earth would make you open your mouth.

It is a startling fact, that pain hurts every single, solitary human being in this world, more than it does any other human being, and by consequence, it hurts you worse than any other. Your teeth are twice as sensitive as anybody else's; the nerve is particularly touchy; nay, the very roots grow round the jaw, so that it is impossible almost to pull them. "*Hinc illæ lachrymæ.*"

Then the dentist begins. He has to ascertain how badly he can hurt you with impunity. You clutch the chair apprehensively, with every muscle and nerve in your body at full tension, while he pokes and cuts around. You are about settling down that it is not so bad as you had feared, your nerves relax, and you think possibly there may be a man of feeling in the profession, when, in a second, he *feels* for you, and finds you, too. You are pierced to the very soul; exquisite pain seems to dart to the roots of your being. The tears come, and when you are sufficiently recovered to look about, your dentist remarks, in the most commonplace manner, "I thought so—nerve's exposed." Then doth he set himself with so much cunning and malace to kill the nerve. He actually lays his sacrilegious hand on the infinitely fine cobweb of a telegraph, by which communication is carried on in your system, and destroys one of the outposts of sensation. In the meantime you muse whether it is right thus to destroy what seems such a particularly near part of yourself. But reflecting what a rebellious member it has been, the nights you have sat up to experience all it could bring to bear upon you, you decide to let it go.

But not a thought of hesitation has filled your dentist's mind, and with a little medicine, which seems to turn your head round and round, and your tooth inside out, and bore into its very roots, he lets you go. A sadder and a wiser woman you arise, with the distinct consciousness that

your dentist thinks you a very weak sister, not half so strong to endure as Miss So-and-so, who could sit down any morning and have half the teeth in her head pulled out, and never whimper. Not only are you mortified for yourself, but because you have brought shame on your half of the human race. Women are such cry-babies, and you who were thought strong-minded are among the worst.

But on inquiring, I hope you will meet the same delightful response that I did from a dentist, whom I have ever after considered a gentleman and a scholar. Thus it was: "Women bear pain a great deal better than men." Comforted not a little by this reflection you leave the office, saying, like the silly fly of our childhood:

"And bidding you good morning now, I'll call another day,"

but mentally resolving never to visit that scene again. But soon, alas, this silly little fly comes slowly, unwillingly creeping back, finds itself "within the little parlor," and "in the little den," taking another turn with the tooth.

Oh! the cruel uncertainty of not knowing whether it will hurt, or what the dentist is doing, and the delight of finding the nerve dead. The communication is cut, and you are happy.

Now let the dentist do his worst. He may dig, and cut, and file, and drill, and mallet, and what care you? You sit in bliss, and retire elated. Next to the satisfaction of a good conscience is that of a good plug in the tooth. You relax the severity of your former judgments. A dentist is undoubtedly a "man and a brother." You shake hands without a spark of malice in your soul. Let us hope that you place the fee promptly in his possession, think of him gratefully, and spread the praises of his skill, consideration and faithfulness wherever you have opportunity.—*Missouri Dental Journal.*

ARTICULATION.

BY W. H. THRIFT, D. D. S.

I have ventured to imagine, I may contribute a short article to the *Register*, that may not be entirely without interest to at least some of your readers.

The manner in which I obtain an articulation in full sets of teeth, is as follows: Over the plaster impressions mould temporary plates made of gutta percha, when cool, trim to suit case, using care that the plates do not interfere with the action of any muscles brought in contact with them, while in the mouth. Now select the teeth to be used in the case, and place the plates in the mouth, with incisor and molar sections temporarily fastened to them. Change the teeth if necessary in getting right articulation; take a strip of wax, warm it first over a spirit lamp, and fasten the two plates together by pressing the wax between incisor and molar sections; after giving the wax time to harden, remove the plates from the mouth together and plaster them on the articulator, not using plaster casts. After the teeth have been ground and arranged to suit, try them in the mouth, and if not right, make the necessary changes before discharging patient.

I claim the following advantages over the old practice, viz: time is saved, and it does away with the danger of marring impressions while grinding and arranging the teeth. It has been my experience that a more accurate articulation is obtained by this method than any other with which I am familiar.—*Dental Register.*

FILLING OVER EXPOSED PULPS, HOW TO DO IT SUCCESSFULLY.

BY G. C. DABOLL, BUFFALO.

A little consideration of the form and nature of the dental pulp may help us to an intelligent appreciation of the kind of treatment it will endure successfully; for, if knocked about the right way, and with the proper materials, the pulp will endure a good deal of professional banging. The pulp cavity in shape corresponds to that of the tooth to which it belongs. The pulp has the same form, and, according to Mr. Thomas Bell, is a very soft, gelatinous, semi-transparent body, having its surface covered by an extremely delicate, thin, vascular membrane, closely attached to it by vessels. The arteries which supply the pulp enter the tooth at the apex of its root, and throw around it a network of circulation, indicating the great vascularity of this tissue. The larger arteries are deep, and communicate with the veins on the surface by great numbers of looped capillaries. The nerves of the pulp come from the superior and inferior maxillary divisions of the fifth, and are seen to form a series of loops.

From the foregoing description, it will be seen that the pulp seems to be constituted of blood-vessels and nerves, enveloped by a very delicate membrane, and blood-vessels, nerves and membrane are in turn confined in the centre of the hard and unyielding substance of the tooth, which, in the event of any disease of the organ in question, serves to complicate the difficulties, and render the more doubtful any treatment, with a view toward the restoration to health. Now a healthy pulp and a diseased one, when we are treating cases of exposure, are two entirely different things, and the careful operator, on having a case presented for his consideration, will, as a fundamental rule, ascertain which he has to deal with; for, with the primary treatment, rests, in a great measure, the final success of the operation. If the pulp is exposed by carelessness in excavating, in a tooth that has never given any trouble to the patient beyond mere sensitiveness, we have a very simple diagnosis. From the description we have had of the pulp, we know that the mere wounding of a vein is exposure, and must be treated as such. If the patient presents a tooth, in the cavity of which, on clearing away the debris, we can distinctly see the pulsation of the arteries, we have a different condition of things, with an equally simple diagnosis. Then we have cases of semi-exposed pulps, that is, with only the slightest possible covering of softened dentine, that separates this mass of blood-vessels and nerves from the air. These come under the head of exposed pulps, and of this condition we meet more than of any other, the treatment of which are as important, and require as much skill as any. Now, we hold that the dental pulp is subject to the same law of health and disease that governs the flesh only to a certain degree, and that only so far as it harmonizes with its more delicate and sensitive nature. Because a wound in the arm or any other portion of the system heals by first intention, it does not necessarily follow that a wound in the dental pulp will do the same. A wounded vein of the pulp will close its walls the same as any other vein in the system, and if protected from irritating agents, will heal as perfectly; but if one of the nerves of the pulp is severed, or an artery ruptured, we very soon comprehend the distinction by the result. A pulp that has once been thoroughly congested, will surely die, and although we may treat it in this condition, it will be of little avail as regards its salvation. We entirely disagree with one of the luminaries of our profession, who claims to believe

that a pulp may be saved, even after ulcers have formed on its surface. The solid walls that protect it in a state of health, in its diseased condition, by confining and restricting its limits, insure its destruction. The mass of arteries, veins and nerves take on an inflamed condition, each separate nerve and blood-vessel swells to its utmost limit, and is pressed and jammed into its neighbor, until a partial or complete state of disintegration, which is synonymous with suppuration, takes place. We all know what an aggravation a ligature or tight bandage is to an inflamed limb, and that is precisely what the tooth is to the inflamed pulp. We must deal with the pulp before it reaches congestion, and therein lies our province as saviors; an irritation or inflammation can be met and subdued, a wounded vein may be healed; but beyond the primary or medium stages, very little can be accomplished.

With the primary treatment of the exposed or inflamed pulp, we come to the consideration of materials for filling, and appreciating the delicate nature of that organ, we must necessarily choose delicate substances, and those that can be adapted or will adapt themselves most perfectly and readily to the diseased surfaces, with the least irritation, and by the application of the least force. For this purpose, we have as yet found nothing superior to Hill's stopping and oxy-chloride of zinc. Each has its peculiar merits, and in special conditions there is a choice in their use. Hill's preparation being a non-conductor, effectually protects the pulp from thermal influences, and in cases of semi-exposure is, in our opinion, to be preferred for temporary fillings. For a wounded vein, or other exposure, the oxy-chloride is far preferable. This can be adapted absolutely without the exertion of any pressure, thereby avoiding one of the principal dangers of the treatment.

If we have a wounded vein, and there has been no previous irritation, as soon as the bleeding ceases and the cavity rinsed with warm water, we apply a little creasote from a pellet of cotton, just enough to moisten the parts immediately over and adjacent to the exposed place, and then fill with zinc. As soon as it is hard, say from ten to fifteen minutes, cut away, leaving enough in the bottom of the cavity to protect it, and fill the balance with gold. If done carefully and thoroughly under these conditions, a failure will be of rare occurrence. In cases of semi-exposure, we rarely meet with one that has not been subject to more or less irritation, and there is very likely to be some lingering inflammation or morbid condition, that must be corrected. These are the instances in which the patient has had a little pain, more or less severe, continuing for an hour or two sometimes, or again only a few minutes, owing to some thermal shock or sudden pressure. These we treat with creasote or carbolic acid, placing it in the cavity on a pledget of cotton, and sealing it with cotton and sandarac. Repeat two or three times at intervals of thirty-six or forty-eight hours, and then fill the cavity with Hill's stopping. This will protect it entirely from thermal changes, and may be left in from four to six weeks, when, if there has been no trouble, remove the filling, and refill partially with zinc and cap with gold. If the tooth will indure the perfect sealing with the gutta percha for a month or six weeks, we regard it as evidence, in ordinary cases, of the health of the pulp. We leave them longer if there is any doubt, or if the case is a bad one, for time is the test. Two or three months in the worst conditions at the farthest, with careful manipulation, will insure nineteen cases out of twenty.

A pulp exposed by the natural decay of the tooth, and that has a portion of its surface entirely denuded, is a dainty subject to deal with. Before it has arrived at this condition, it has passed through many tribulations, and only escaped congestion by some rare and happy combination of circumstances. There has been, of course, some inflammation, the result of numberless thermal shocks, if nothing more, and this adds to its natural sensibility a morbid condition that complicates the case excessively. Our first step is to be assured of the absence of congestion; and one of the most reliable indications to our mind, is the vitality of the nerve filaments in tubuli, and a partial excavation will soon satisfy us. This, with the knowledge we can get on the subject as to the amount and character of pain experienced at different times, will give us a tolerably accurate diagnosis. Having removed as much of the decay as possible, we lay a pledget of cotton, saturated with creasote, directly over the part exposed, and seal loosely with sandarac and cotton, great care being exercised that there shall be no pressure. After one or two treatments fill the cavity with zinc. If all right, the pain caused by the filling will pass off in from two to six hours. If subsequently the tooth is very sensitive to heat and cold, cut away a portion of the filling, and cap with Hill's stopping. Such cases as these we leave for three months, then remove the filling, and ascertain the condition of the pulp; if we find it alive, refill with zinc and cap with gold. We have had a few cases in which the nerve died, the creasote neutralizing the gases, and the tooth giving no trouble up to the time it was examined; but these are rare, and it will be found that inflammation will supervene in a short time after the temporary filling has been introduced, if everything is not all right. When there has been but very little previous irritation, we do not stop to treat with antiseptics, but moisten the cavity with creasote or carbolic acid, and fill immediately with zinc. In numbers of cases where the tooth has been presented in an aching condition, it being the first instance, we have treated and filled with perfect success.

We do not claim infallibility, but give this as our mode of treatment, from which the percentage of failures has been so small that we feel justified in claiming for it the careful consideration of every man that is not already practicing it. We can save teeth by extirpating the pulps, and if it comes to the worst it is beyond a doubt a great blessing; but as compared with the salvation of the pulp and restoring the organ to its normal condition of health and usefulness, it is not a question for argument. —*Canada Journal of Dental Science.*

Cancer of the Breast.—An Italian medical journal recommends the following as an application in cancer of the breast: Concentrated acetic acid, 15 parts; creasote, 3½ parts; water, 450 parts. A case is mentioned in which a cancer was removed and cicatrization completed in six weeks. The application was made on charpie, four or five times daily.

Deodorized Carbolic Acid.—The odor of carbolic acid may be removed by combining two parts of gum camphor and one of carbolic acid in crystals, and mixing with whitening. A liquid is thus formed with powerful disinfecting properties, but entirely free from the foul odor of carbolic acid.

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T. L. BUCKINGHAM, DEAN,
1206 *Vine Street.*

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The Fourteenth Annual Session, 1869-'70.

PRELIMINARY LECTURES AND INSTRUCTIONS.—The Dispensary and Laboratory of the College will be opened on the 1st of September, where ample opportunities will be afforded the student, until the close of the session, for the prosecution of the practical part of the profession, under the guidance and supervision of Demonstrators of known integrity and capability; and during October Preliminary Lectures will be delivered. In this month, as well as through the entire session, a clinical lecture will be given, and operations performed by one of the Professors every Saturday afternoon.

THE REGULAR SESSION

Will commence on the first Monday in November, and continue until the first o March ensuing. The course is so arranged that about eighteen lectures will be delivered each week on the various branches taught in the College. A synopsis of which is given below:

CHEMISTRY.

The Course of Instruction from this Chair will commence with the considerations of the forces that act upon matter, and the laws which govern those forces Chemical nomenclature, the individual elements, and the compounds resulting from their combination, will then be considered. The course will be illustrated by diagrams and such experiments as can be performed before the class.

MECHANICAL DENTISTRY AND METALLURGY.

The instructions from this chair will embrace—the proper fitting up of a dental laboratory, the use of tools, refining, melting, alloying, and working of the precious metals, and the properties and combinations or alloys of the base metals used by the dentist; the description of the materials, their preparation, and the most approved formula for making porcelain teeth and blocks, together with the proper manner of compounding them; the history and properties of all substances called into requisition in making dental substitutes; the entire range of manipulation of the different materials used as a base, from the impression to the completion, and proper adjustment of the case in the mouth, and such other information as appertains to this chair. The lectures will be amply illustrated by specimens, models and diagrams, and the practical application will be given in the Laboratory, under the supervision of an accomplished Mechanical Dentist.

DENTAL PATHOLOGY AND THERAPEUTICS.

The lectures delivered from this chair will embrace General Pathology, Dental Pathology, the Pathological Relations of the Teeth to other parts of the System, together with a minute description of all special diseases that have any relation to Dental Surgery, or of interest to the Dentist. They will also include a careful examination of therapeutic agents and their general application. Their indication in the medical and surgical treatment of diseases of the mouth, both idiopathic and symptomatic, will be fully illustrated. Special attention will be directed to the application of all the Anæsthetic Agents.

ANATOMY AND SURGERY.

The instruction in this department will embrace a plain and comprehensive view of the structure of the human body. The lectures and the demonstrations will be given over *the dead body dissected for the express purpose* of elucidating the subject. With the same object, vivisections on the lower animals, while under the influence of an Anæsthetic Agent, will be employed.. Such description of the comparative anatomy, microscopical structure and connections of the teeth, as their importance may demand, will be fully given. The valuable and extensive collections of Anatomical Preparations of the incumbent of this chair, consisting of wet and dried specimens, papier mache manikins, models in wood, and accurate French plates, will enable him to illustrate his course of lectures very clearly.

In addition to the above course, a Surgical Clinic will be held by Doctor Forbes during every week, for the purpose of performing such operations in oral and general Surgery as may be deemed advisable to advance the student in this particular branch of knowledge. The cases will be selected from a dispensary which the Faculty have established.

DENTAL HISTOLOGY AND OPERATIVE DENTISTRY.

The lectures of this department will embrace the comparative anatomy of the teeth, the functions and microscopical pecularities of the dental organs, the development of teeth and their component tissues. It will also include a full description of the materials and instruments used in operative dentistry, and will comprise a thorough elucidation of all the operations required of the Dental Practitioner, such as filling, extracting, regulating, &c. &c. A portion of the course will be devoted to a description of the microscope and the modes of preparing specimens. The incumbent of this chair will practically demonstrate in the clinic the theories taught.

CLINICAL INSTRUCTIONS.

In addition to the above, with the exception of Saturday, four hours are daily spent by the student in actual practice under the supervision of the demonstrators.

In the Operative Department.—To afford every facility to the student to acquire a thorough practical knowledge of this branch, the operating rooms are furnished with twenty-eight chairs, so arranged as to command the best light, and all the appliances for comfort and use. To these chairs the students are assigned in classes, and certain hours are fixed for each member of the class to operate. Every student is required to provide his own instruments, except those for extracting. He is expected to keep them in perfect order, and will be provided with a place in which they can be locked when not in use.

In the Mechanical Department.—In the Laboratory are all the conveniences for the preparation of the metals, manufacture of teeth, single and block, mounting, &c. Every process known in the profession, which has any value to the mechanical dentist, is fully taught, and receipts of valuable compounds are freely imparted; and the student is required to go through all the necessary manipulations connected with the insertion of artificial teeth—from taking the impression of the mouth to the entire construction of the denture, and its proper adjustment in the mouth of the patient. Every student is required to furnish his own bench tools, and will be provided with a drawer which he can lock.

Practical Anatomy.—The great facilities for the study of practical anatomy to be found in Philadelphia, in several well ordered and supplied dissecting rooms, present to the student advantages for its prosecution superior to those offered in any other city.

Hospital Clinics.—In addition to the facilities afforded by the College for a thorough course of instruction in the theory and practice of dentistry, the celebrated hospitals and clinics of the city constantly enable the students to witness various important surgical operations which are highly interesting and instructive. The medical and surgical clinics of the Pennsylvania and Philadelphia Hospitals, two of the largest eleemosynary establishments in the world, are open to medical and dental students, free of charge.

FEES.

Matriculation, (paid but once,)	\$5 00
For the Course, (Demonstrator's ticket included,)	100 00
Diploma,	30 00

TEXT BOOKS AND WORKS OF REFERENCE.

Leidy's or Gray's Anatomy; Carpenter's or Kirk's Physiology; United States Dispensatory; Pereira's, Biddle's or Stille's Therapeutics; Fownes' Elements of Chemistry; Regnault's Chemistry; Lehmann's Physiological Chemistry; Hartshorne's Principles and Practice of Medicine; Wood's Practice; Tomes' Dental Physiology and Surgery; Harris' Principles and Practice; Taft's Operative Dentistry; Richardson's Mechanical Dentistry; Wildman's Instructions in Vulcanite Work; Barker on Nitrous Oxide; Gross' or Erichsen's System of Surgery; Paget's Surgical Pathology, or other standard works on the subject.

QUALIFICATIONS FOR GRADUATION.

The candidate must be twenty-one years of age. He must have studied under a private preceptor at least two years, including his course of instruction at the College. Attendance on two full courses of lectures in this institution will be required, but satisfactory evidence of having attended one full course of lectures in any respectable dental or medical school, will be considered equivalent to the first course of lectures in this College. Also satisfactory evidence of having been in practice five years, inclusive of term of pupilage, will be considered equivalent to the first course of lectures.

The candidate for graduation must prepare a thesis upon some subject connected with the theory or practice of dentistry. He must treat thoroughly some patient requiring all the usual dental operations, and bring such patient before

the Professor of Operative Dentistry. He must, also, take up at least one artificial case, and after it is completed, bring his patient before the Professor of Mechanical Dentistry. He must, also, prepare a specimen case to be deposited in the College collection. The operations must be performed, and the work in the artificial cases done at the College building. He must also undergo an examination by the Faculty, when, if found qualified, he shall be recommended to the Board of Trustees: and, if approved by them, shall receive the degree of Doctor of Dental Surgery.

Candidates for Graduation who have not Attended Lectures.—Dentists who have been in continued practice since 1852, are eligible to be candidates for graduation without attendance on lectures. The candidate for graduation must present satisfactory evidence of his having been in practice for the allotted time, also of his good standing in the profession. He must prepare a thesis upon some subject connected with the theory or practice of dentistry. He must present specimens of his workmanship. He must undergo a satisfactory examination by the Faculty, on each of the branches taught by them; when, if qualified, he shall be recommended to the Board of Trustees, and if approved, shall receive the degree of Doctor of Dental Surgery. Of this class of graduates, the matriculation and diploma fees only are required.

For further information, address

T. L. BUCKINGHAM, Dean,
No. 1206 Vine Street, Philadelphia.

Board can be obtained at from $4.00 to $8.00 per week.

All the Instruments and Tools required can be procured for from $15.00 to $20.00.

THE

DENTAL TIMES,

A

QUARTERLY JOURNAL

OF

DENTAL SCIENCE.

PUBLISHED BY

THE FACULTY

OF THE

Pennsylvania College of Dental Surgery.

VOL. VIII.

PHILADELPHIA:
1870-71.

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DENTAL TIMES.

VOL. VIII. PHILADELPHIA, JULY, 1870. No. 1.

Original.

ON THE EXTRACTION OF TEETH.

BY JOHN M'CALLA, D. D. S.

[Read before and published by request of the State Dental Society of Pennsylvania.]

The proper treatment of any of the ills which afflict humanity should be the subject of patient and scientific research on the part of every one connected in any way with the healing art. This is no less true of the dental than of the general surgeon. The organs with which he has to deal, are most intimately connected with nerves which throb with the keenest agony in suffering, or thrill with the most delightful sensations of pleasure and enjoyment in health. How skillful, then, should be the hand, and perfect the knowledge of the operator whose field of labor lies so near to the sensorium of the system. We are apt to suppose, in this enlightened age, that a higher point has been attained on the steep declivity of the hill of science, than our predecessors ever reached, and while we admit that rapid strides have been made in this direction, let us not forget the fact, that long before the beginning of the Christian era, the reputation of the Egyptian physicians and surgeons extended throughout the then known world; the monarchs of Persia and other countries for many ages employed them alone. The prevalence of ophthalmia and other diseases of the eyes in these countries, gave medical men ample scope for the exercise of their art, and thus a degree of proficiency was acquired, which caused the Egyptian oculist to be considered the most fitting offering one sovereign could make to another. Dental maladies, on the other hand, were seldom met with in Egypt, and it is to this cause, no doubt, that we may attribute the general silence of authors respecting their proficiency as dentists. It is well known that a carious tooth is seldom to be met with in any of their ancient mummies. Herodotus, the first Greek historian, says, "The art of medicine is so practised in Egypt, that there is found an individual healer for each individual distemper. Hence the

whole country is filled with healers; some take charge of the disorders of the eyes, others of those of the head, others of those of the *teeth*, others of those of the belly, and others of secret diseases." From the hereditary character of these several offices, we may imagine that a high degree of proficiency would be acquired in the various specialties.

The ancients, we find, were generally opposed to the extraction of teeth, and advise various remedies instead, such as plugging with lead, (plumbing,) plugging with iron, galbanum, wax, the application of the actual cautery, the wearing of charms, &c. When the operation was deemed imperative, a serrated instrument, called by the Greeks rizagra, was first employed to shake or loosen the tooth; the head of the patient was then placed between the knees of the operator, in order to keep it steady, and should the tooth not come out readily, a kind of hook or lever was inserted under it, on all sides, so as to raise it a little, before again attempting its extraction, when the operation was completed by pulling it perpendicularly. The best received authorities of the day recommend great hesitation and precaution before proceeding to the extraction of teeth.

Coelius condemns the inconsiderate extraction of teeth, and urges, above all things, "that care should be taken in the removal of those that are firmly fixed, as the adjacent parts, particularly the eyes, are always affected by the operation, and frequently it is not only one tooth, but the entire jaw which aches, in such a manner as to render it necessary to extract all the teeth, in order to obtain relief." Another states that when a tooth which is loose or painful is to be extracted, "the nose of the patient should be rubbed with brown sugar and ivy and green oil; he is advised to hold his breath, a stone is then placed between his teeth, and he is made to close his mouth; the fluid which causes the pain is then seen to flow from the mouth in such quantity as frequently to fill three pots; after having cleansed the nose with pure oil, and rinsed the mouth with wine, the tooth is no longer painful, and may be easily extracted. To preserve one's self to a certainty from toothache, it is only necessary, at the return of the swallow in the spring of the year, to repair silently to the border of a clear rivulet, take some of the water in the mouth, and rub the teeth with the forefinger of both hands, and repeat a certain form of words. Another recommends that the roots be anointed with flour and the juice of tithymal, after which the teeth will fall out.

In pursuing the subject of extraction of teeth, allow me to offer a few remarks on the instruments employed for that purpose, both ancient and modern; note some of the most important improvements, and point out the style of instrument which, from long experience, I have been led to prefer, and, as far as practicable, show the mode of applying them to the teeth to be removed.

Among the first instruments of which we have any account, is the *vulsella*, described by Celsus, about the commencement of the Christian era; it is said to have been a kind of forceps, the beaks resembling the bill of a parrot; this instrument, with slight alterations, came in time to be known as the hawksbill forceps, or *davier* of the French, and in connection with various levers and punches, continued in use for several centuries. The *elevator* next succeeded the forceps, and if we may judge from the description given of the method of using it, we shall be forced to the conviction that the operation of extracting teeth lost none of its terrors by the change. Following this, we have an instrument similar in its action to the key, furnished with claw and fulcrum, but lacking the power and safety of the latter. Among the levers employed, we find the *peid-de-biche*, (hind's foot,) *langue-de-carp*, (carp's tongue,) or *trevelin* of Lecluse, for the extraction of roots: it is a curved lever, terminating in a bayonet point, and was said to be a perfect instrument for the extraction of wisdom teeth, by placing it between it and the second molar. Another, called the lever *a-crochet-et-a-plague*, (the lever with hook and plate,) bears some resemblance to the key, though much inferior to that instrument. The *pelecan*, an instrument formerly much in use, was furnished with a lever, fulcrum and claw, and approximated more closely to the key than any of its predecessors. In the early part of the 18th century, the *key* instrument, invented by Garengeot, came into use; the facility of acquiring command of this instrument, and the amount of force it was capable of exerting, soon brought it into general favor, and it must be admitted that where but one instrument could be obtained, none would answer all purposes so well as the key; its defects were sought to be remedied from time to time by the ingenuity of Van Butchell, Spence, Savigny, Duval and a host of others; to the last named gentleman we are indebted for the introduction of the movable fulcrum, one of the most valuable improvements which this instrument has undergone.

To Mr. Cartwright, of London, we are indebted for the first return to the use of the forceps; he so improved them as to enhance very much their efficiency, and about the year 1830 first brought them to public notice; they soon came to be regarded as safer and more reliable than the key. Mr. Snell, taking up the idea of Cartwright, soon followed in the line of improvement, by adapting the beaks to the necks of the different classes of teeth, by means of nibs, grooves and crescents, and added to the better application of the extractive force, by bending one of the handles so as to pass round the hand of the operator, thus preventing the liability of slipping. Dr. J. F. Flagg, of Boston, is entitled to the credit of an improvement in the hawksbill forceps, which consisted in more accurately adapting its form to the necks of the teeth, and at the same time

giving a shape and position to the handles, which would enable the operator to apply the necessary power to greater advantage. A further improvement on Snell's instruments, by Prof. C. A. Harris, consisted in such a change of the handles, as brought the motive power, or hand, nearer on a line with the long axis of the tooth, while the change in the angles and curves enabled the operator to bring the hand nearer to his chest, and under the instrument, thus giving greater command over it, without any loss of power.

Dr. Edward P. Church supplied a want long felt by the profession, in the invention of forceps forming two nearly right angles, above the joint, for the extraction of the superior wisdom teeth.

Dr. J. W. Crane, of New York, invented two pairs of forceps for the extraction of lower molars; one for the first and second, on either side, and the other for the wisdom teeth.

Dr. Hullihen's compound screw forceps. for the extraction of the roots of incisors and canine, in the upper jaw, you are all familiar with.

To Dr. E. Maynard, of Washington, D. C., we are indebted for forceps designed for the removal of the roots of upper molar teeth, before they have become separated from each other; there are two pairs, one for each side of the mouth, and though not often brought into requisition, they are admirably adapted to the class of cases for which they are intended.

Dr. Elliott has furnished an instrument for the extraction of the roots of molar and bicuspid teeth; but of its merits we are not prepared to speak.

The forceps bearing the name of Dr. Physick are found to be very useful in separating the roots of lower molars previous to their removal; they have been highly spoken of by some operators for the extraction of lower wisdom teeth.

John Tomes, of London, claims to have made valuable improvements in tooth forceps.

Mr. Fay and Mr. Mathews, both of England, introduced, some years ago, what was known as the *adjusted forceps;* they were brought to notice by both these gentlemen about the same time, neither being aware of the other's improvement. The advantages possessed by these instruments consist in their anatomical adaptation to the necks and crowns of the several classes of the teeth, and this we regard as a *sine qua non* in the fabrication of dental forceps.

The importance of starting out in the profession with good instruments cannot be over-estimated. With those first adopted we become most familiar from daily association, and while their defects may be numerous and radical, we are sometimes slow to recognize and correct them. I have met with instruments for extracting teeth, in the cases of both physicians and dentists, that would set at defiance all the known laws of

mechanics, and overmatch the ingenuity of the most skillful artisan to adapt them to any useful purpose. Our advice invariably in such cases is, throw them away, put them beyond your reach, and thus reduce the chances of fracture and other unpleasant complications. It is too frequently the case that young beginners procure such instruments as are pointed out to them, or take up those of some one retiring from practice, and seldom or never entertain the idea of improvement. We are happy to say, however, that this is not the rule; valuable improvements have been made from time to time, and the results of a combination of these are now to be found in the hands of a large portion of the operators of the present day. The most important requisites in forceps we conceive to be—1st. A proper adaptation of the beaks to the necks and crowns of the teeth. 2d. The handles should be as near on a line with the longest axis of the tooth as possible, yet sufficiently bent to avoid coming in contact with the opposite jaw. 3d. The length of handle should conform to the hand of the operator; long handles are particularly objectionable. 4th. The handles should be bent in such a manner as to place the operator in the most favorable position in relation to the patient. This is generally conceded to be on the right side, or right and rear. The head is best controlled in this position.

To insure success in the extraction of teeth, a careful diagnosis is of the first importance; an accurate acquaintance with the normal and pathological conditions of the teeth and their surroundings, and a sound judgment in relation to the obstacles to be encountered, is calculated to inspire the operator with a confidence in his own practical abilities, which will enable him to meet the physical indications in each individual case.

Another object to be aimed at is to gain the confidence of the patient. A kind and affable demeanor on the part of the operator, accompanied with candor and firmness, will seldom fail to accomplish this object. All unnecessary display of instruments should be avoided, and the surroundings of such a character as to allay the fearful apprehensions of the weak and timid. These conditions being complied with, we are now prepared to select the instrument best suited to the case in hand.

For the removal of the upper incisors, the instrument most frequently employed has straight beaks, and on a line with the handle, both blades grooved and crescent-shaped at point; to conform to the necks of this class of teeth, the bowl or beaks should be sufficiently separated to admit the crown without pressure, as the object should be to grasp the tooth at or above the neck, in order to secure the best results. It will be found most convenient to have the lower handle bent, to pass round the little finger of the operator; the motion which I have found most effective in the removal of these teeth is the downward, or inward, after a slight

rotary movement; the alveolus being shorter and thinner on the inner side, the attachments are more readily sundered by a motion in this direction. The instrument which I prefer for extracting the upper bicuspids differs from the one just described, in having the beaks narrower, and bent at an angle of about forty degrees, with straight handles; to give the necessary strength to this instrument, we should add to the thickness of the beak what it lacks in width. One instrument answers for both sides of the mouth. The rotary motion is inadmissible in the removal of these teeth, owing to their conformation and position; the outward and inward motions should be given, particularly the latter. The value I set upon this instrument may be estimated, when it is known that I use it for all roots in the upper jaw, after they have become separated from each other, and not unfrequently have extracted all the upper incisors, canine and bicuspids, with it alone.

The upper molar teeth having three roots, two buccal and one palatine, instruments for their extraction should be constructed to meet this anatomical arrangement; hence the necessity for two pairs, right and left, straight handles, and the beaks sufficiently wide to take in all the crown, and bent at an angle of about forty degrees; the point of the inner beak should be curved, so as to embrace closely the palatine root, while the outer one requires a double groove, terminating near the centre in a strong sharp nib. In arresting the tooth, this nib is forced into the depression between the buccal roots, when the inward and outward motion is given, and the organ dislodged. I prefer to have one of the handles curved, as in the incisor instrument.

The forceps previously noticed as the invention of Dr. Church, are well calculated for the extraction of the upper wisdom teeth; the beaks are parallel with the handles, but removed about one inch from the same line by means of two angles above the joint; the points are both crescent-shaped. It is but seldom that we meet with a divergence in the roots of these teeth, hence the nib is not required. This instrument answers equally well for both sides of the mouth.

Passing to the lower jaw, we select an instrument for the removal of the incisors, canine and bicuspids, similar to the one employed for the upper bicuspids, the only difference being in the angle of the beaks, that of the upper being about forty degrees, while the one now under consideration has an angle of sixty degrees at least; the handles straight, and beaks narrow but stout. With this instrument I remove the ten anterior teeth in the lower jaw, and all the roots of lower molars after they have become separated from each other.

For the extraction of the lower molar teeth, one instrument is sufficient for both sides of the mouth. These teeth having two roots, both beaks

of the forceps should be furnished with stout nibs, to penetrate the bifurcation; holding the instrument in the right hand, as if about to use it, and taking the shank, or joint, as the base, we have the handles bent toward the left hand of the operator at an angle of forty degrees, while the beaks present the same angle, in a forward direction, one handle bent around the hand, and the bowl to conform with those previously described. This instrument I regard as decidedly the best I have ever met with for the class of teeth for which it is intended.

For the extraction of the inferior *dens sapientia*, an instrument with straight handles is to be preferred; the beaks slightly narrower than those last named, and bent at an angle of about sixty degrees, both points crescent-shaped; the shank should be as small as is consistent with the required strength, in order to afford a full view of the parts to be operated upon; as the roots of these teeth usually turn back into the ramus of the jaw, to a greater or less extent, it becomes necessary to have other appliances at hand, to meet emergencies. The Physick forceps may occasionally be found useful here. I have not employed them to any considerable extent for this purpose. A stout lever, with angles similar to those of the upper wisdom forceps, will be found very valuable, introduced behind the second molar; the force should be applied to the wisdom tooth in an upward and backward direction, following every movement with the eye, in order to guard against forcing the tooth into the throat of the patient.

Having now described all the instruments necessary for the *ordinary* operations of extraction, let me call your attention to some of those employed for *extraordinary* cases; and first, for the removal of the upper incisor and canine roots, we have the conical screw, compound screw forceps punch and gouge. I have tried them all, but for a number of years past, have depended almost entirely upon my upper root forceps. Where the crowns of upper molars have been broken off, or removed by caries, yet an unbroken connection remains between the roofs, I have found the instruments invented by Dr. Maynard to excel all others that I have met with. The upper beak forms a sharp, strong hook, bent in such a manner as to be made to readily pass through the alveolus, taking firm hold above the junction of the roots, while the lower beak is similar to those of the upper molar forceps; the motion is downward or inward, readily wrenching the organ from its attachments; or when the union between the roots is too slight to resist the force, a separation takes place, when they are readily removed by the upper root instrument. Where the same conditions exist in relation to the lower molars, I resort at once to the Physick forceps to separate the roots, and then remove them with the lower root forceps. It is sometimes necessary to extract teeth on account of their irregularity. Where three stand together in a group, it will be

found that narrow, strong beaks are indispensable; the locality of the deviating organ will at once suggest to the mind of the operator the form of instrument best calculated to remove the difficulty.

I have not thought it necessary to occupy your time with any remarks in regard to the extraction of deciduous teeth. I have but one instrument specially devoted to this class; it is a small pair of forceps from the manufactory of Charriere, of Paris. They are the neatest, most convenient, and best adapted forceps I have ever met with, for the removal of deciduous molars; for all other teeth of the first set, I depend upon those already described.

A diversity of opinion exists in regard to the propriety of lancing the gums as a preliminary to extraction. It is contended by some that the attachment of the gum to the neck of a tooth is always but slight, and the extent inconsiderable, and that therefore its severance can have little or no influence in lessening the amount of force required in extraction. Again, it is admitted that there is a difference; that the gums should be separated from the teeth before removal; but for this purpose it is suggested that sharp forceps, driven forcibly into the gums, does the work more thoroughly, and is attended with no more pain than that produced by the lancet. Without stopping to combat these opinions, allow me to say, that I regard the lancet as one of the most important instruments in my case. I do not invariably employ it, but it is my practice to lance well, and I do contend that no timid hand should guide the blade. If the instrument is carefully kept, with a smooth and keen edge, the pain attending its use is inconsiderable, and more than counterbalanced by the increased facilities afforded for the expeditious and safe removal of the offending organ. The common thin, flat handle is liable to turn in the hand; I have found an octagon handle less liable to do so, and much to be preferred.

And now a word as to the relative position of operator and patient. This is a matter concerning which no rules can be laid down. The form of instrument employed controls the operator in a great degree as to the position he assumes. With instruments of the hawksbill variety, the operator is compelled to follow the inclination of the instrument, sometimes on one side of the patient, and sometimes on the other; while with the instruments here described, the operator is never required to leave the right side of the patient, and is thus the better enabled to control the head with his left hand. The only deviation from this rule is in the extraction of the right inferior bicuspids and wisdom tooth, when he turns and faces the patient, though still retaining his position on the right side. Another important point is to have the operating chair neither too high nor too low. In a word, the surroundings must be such as will best

enable us to command the situation; for this purpose I have two small, separate platforms, each about four inches in height, placed one upon the other, at the back of my chair; the upper one is easily moved by the foot, and is always ready in time of need. In extracting from the lower jaw, we get upon one or the other of these platforms, as the case may require; while, in operations in the upper jaw, we remain on the floor, or mount the first platform, if need be. To be able to distinguish promptly the requirements in each case that presents itself, includes not only a thorough knowledge of the buccal cavity in health and disease, but a familiarity with the various forms of instruments, and their modes of action. In this way alone can we acquire that manual dexterity which should ever distinguish the accomplished surgeon.

ON THE DENTAL PULP, ITS TREATMENT WHEN EXPOSED, AND THE BEST MEANS OF PREVENTING EXPOSURE.

BY G. B. M'DONNELD.

[Read before and published by request of the State Dental Society of Pennsylvania.]

The subject of my present remarks, preparatory to its more general discussion by the members of this Society, relates to exposed pulps, the causes of, and the best means of preventing exposure. Who has not had a pulp exposed, and if so, suffered one of the most excruciating pains that mortals can endure and live? I speak from actual experience in this matter, having had an excavator break through to the pulp in a tooth. Well, I lived through it, and am here to tell the story, but I don't want to try the experiment again, and will do everything in my power to avoid so great a calamity by strict cleanliness of mouth, having my teeth often examined, cavities filled as soon as discovered, in the best manner and with the best materials. In a review of my practice for the last seventeen years, I can well remember the anxious patients, with faces upturned to mine, asking the question, "Is the nerve exposed?" and then the look of terror when informed that such was the case, for they knew full well what must follow the exposure of a pulp, either extirpation of it, or extraction of the tooth. In view of all these painful considerations, I think I shall be sustained by the profession generally in the assertion that, directly and indirectly, exposed pulps have caused us more trouble, and our patients more pain, than all the other diseases of the teeth combined. The immediate causes of exposed pulps are, decay, fracture and wearing away of the teeth. The more remote causes are, imperfectly developed teeth, the results of imperfect constitutions, made so not unfrequently by the indulgence in improper food, and excesses incidental to civilized life. Well might we as well expect to dip pure water from a stagnant

pool as to have perfect teeth developed from imperfect and diseased constitutions. Like produces like the world over, and the great fundamental preventive for exposed pulps is so to live and regulate our diet and habits as to develop the highest type of being. Then, on the principle of like producing like, we shall have a more perfect growth of tooth substance in all its parts, so hard and dense as to defy all attacks from the destructive agents that come in contact with the teeth. When this condition of systemic purity exists, there will be few or no destructive agents in the mouth to make war on the teeth. The diet should abound with bone-making material. The miller's bolting cloth robs us of three-fourths of the phosphates in our bread, and we give it to lower animals, thus assisting them to have good teeth, whether we have any or not. Cleanliness should exist in the mouth at all times and under all circumstances; neither tartar or food undergoing decomposition and generating destructive acids should ever be allowed a lodgment there. If the foregoing preventives were strictly lived up to, we should not have many pulps exposed. Imperfect teeth, soft and chalky, soon give way to the action of the destructive agents found in the mouth. Decomposing acids are at work separating the lime salts from the animal matter, or *vice versa*, and as fast as they are separated they are washed away, until the pulp becomes exposed. When this occurs, from any cause whatever, the treatment instituted should be conservative, looking toward the saving of that organ and the teeth, if possible. I am aware that there is a large class of the profession who advocate and practice the immediate extirpation of the pulp, and filling the cavity in the root, and argue that, after the development and formation of a tooth, the pulp is no longer of any use, and may be dispensed with, at the same time doubting the practicability of saving pulps by capping with oxychloride of zinc. It is claimed by them that the tooth pulp is of such a peculiar nature, and so susceptible of diseased action, that after it has become affected it cannot be restored to a healthy condition. Facts contradict this theory, as the experience of hundreds of the profession will testify, and show conclusively that they are susceptible of treatment and cure the same as other tissues of the body. The success attending the methods of treating exposed pulps, practiced by many of our best dentists for several years, and by myself for the past three years, is a source of more encouragement than a hundred theories. I am happy to say that the old and barbarous practice of extirpating pulps is surely giving way to the more humane and enlightened one of capping with oxychloride of zinc, thereby preserving them alive. When the pulp of a tooth is but recently exposed, the patient in robust health, the blood pure, I believe that nineteen-twentieths of such pulps can be saved by capping with oxychloride and filling with gold.

There are three classes of pulps, which can, in my opinion, be treated with a fair prospect of saving them. The first, where there is simple exposure; to this I would apply a cap of oxychloride. The second, where the pulp is exposed and wounded so as to bleed; I here apply creasote as an astringent, and cap as in the first case. The third is, where the pulp has become congested and has given pain; here we use means to reduce congestion, and then fill as before. In the past two years I have capped over fifty pulps with oxychloride, and know of only six cases where the pulp has died.

Some of the causes of failure in the use of oxychloride are in consequence of diseased conditions of the blood, or the oxychloride was introduced too hard, causing pressure on the pulp, or the cap was made so thin and soft as to break down under the pressure of the gold used in filling, thereby causing pressure on the pulp, and exposing it to thermal changes, thus inducing one of the most prolific causes of inflammation.

There are those in the profession who say they cannot part with old established practices for new and untried theories, and will cite us to failures with oxychloride, and tell us to wait ten or twenty years and then we shall know more about it. That is just what we propose to do, work and wait, and when they discover something better than oxychloride for the protection of the pulps we will try it. When we want to judge of the merits or demerits of a particular mode of practice or treatment we should look at the rule, and not the exceptions to the rule. The dentist who rides his hobby to the exclusion of to him untried practices or remedies, is very apt to get left in the rear rank of the profession. The world moves onward, and so does the science of dentistry. There is no such thing as driving stakes, and saying, "thus far shalt thou go and no further."

We should be eclectic in our practice, trying all things, and holding fast that which is good. What is good practice to-day may be bad practice to-morrow. Compare the practice of twenty years ago with that of the present time, and it amply proves this assertion. The general practice of destroying tooth pulps is one that should be abolished. Some of the objections to it are, first, it is heroic treatment, requiring more nerve than many patients can bring to their assistance. There is also difficulty in removing all of the pulp from teeth having bifurcated roots. There is gradual wasting away of the investing membranes and gums around the teeth, and the loss of that bright life-like appearance of a living tooth. These are sufficient reasons why a live tooth is better than a dead one.

I find an article in the October number of the *Dental Register*, of 1869, page 443, from the pen of Dr. Taft, who may be considered good autho-

rity, so admirably adapted to this subject that I quote it in full. Dr. Taft says:

"The object of the faithful dentist will ever be to enlarge the sphere of his usefulness, and to accomplish this he must bring to his aid whatever of methods and materials may be made available. The use of os artificial as a covering for exposed pulps has been fully described by some who early employed it for this purpose. The method proposed in this description, and since employed by many in the profession, is simply the covering the orifice of pulp exposure by the os artificial, bringing it in contact with the exposed pulp. In many cases the pulp is so susceptible to the action of the zinc chloride as to take on inflammation, become painful and devitalized, following which will be the usual train of circumstances attending such conditions. Such a result may ordinarily be averted by preventing the contact of the escharotic. This may be accomplished by either of two or three simple methods, first, by placing carefully over the orifice of exposure a small thin piece of Hill's stopping, or even gutta percha softened by heat, so as thoroughly to protect the pulp from the contact of the zinc chloride.

"A more perfect covering, and one that will certainly occupy all space, may be made by a coating of collodion, or a thick solution of gutta percha and chloroform; this is preferable to the former. A thick covering of the solution is placed over and around the orifice of exposure, and the chloroform may be almost instantly evaporated by throwing into the cavity a jet of warm air. If there is an excess of the covering it may be trimmed off. The cavity, after being perfectly dried by the warm air jet, is ready for the os artificial, which should have as great consistence as the proper manipulation will admit. The cavity in all cases may be completely filled, and if a gold filling is to be made, the os artificial will cut away to the proper point.

"Instead of using the solution for a covering, as suggested, a small pledget of cotton, moistened with carbolic acid, or any other agent indicated, may be placed on the orifice of exposure, and then the cavity filled as before. Another method of protecting the exposed pulp from the action of the zinc chloride is cauterization by nitric acid, after which the os artificial may be directly applied, and will seldom, if ever, cause the slightest pain. Os artificial cannot be relied upon for permanent fillings, except to some extent in certain cases. We regard it, however, as invaluable for the purpose already mentioned. The extent to which the os artificial should be excavated for filling with gold, will be determined by the size and depth of the original cavity. In all cases, however, sufficient excavations should be made to admit of a firmly attached and well adapted filling.

"In a shallow cavity there will be a mere lamina of the primary filling, while in those of greater depth, one-third to two-thirds of the cavity may be filled with it. Os artificial of the best quality only, such as will become very hard, should be used for this purpose. It then affords an excellent foundation for gold filling. We doubt not, that with proper care, as good gold fillings may be made upon a base of this kind as upon dentine itself, providing, always, that the walls of the cavity are of dentine, and are sufficient to guarantee a good support. The os artificial should, in no case, extend to the orifice of the cavity.

"In teeth, the pulps of which are gone, with a large cavity, pulp chambers and canals of roots, all to be filled, may be treated upon the general plan we have indicated, with an assurance of success equal to any other.

"After the most careful preparation of the whole case in the usual manner, the canals in the roots should be filled with gold, then fill the pulp chamber and decayed cavity with the os artificial, then excavate this to the proper extent and fill with gold.

"There are two or three advantages accruing from this method of operating, especially in extreme cases, that are quite apparent upon the mere statement, and the first is where there are living pulps, the ease and facility thus afforded of introducing gold fillings without a possibility of the slightest injury to the pulp. Another is the entire protection of the pulp from thermal changes, thus placing it in as nearly its original condition as it seems possible.

"Again, in those large and very prolonged operations, as heretofore performed with gold only, involving excessive fatigue to both patient and operator, the work, by the method we have suggested, becomes very much less laborious and fatiguing to all concerned.

"It may be said, this is a matter of no consequence; but it is a matter of very great importance when we consider that some of the very best men in our profession have become broken down and worn out by the excessive labor and fatigue involved in prolonged and tedious operations. Our experience in the methods indicated above runs through about four years, with no other indications than those of the most desirable character."

I will now relate a case of surgery that came under my observation which is applicable to our profession.

Dr. Frank Hamilton, formerly of Buffalo, and more recently of New York, was, at one time, performing an operation for a friend of mine before a class of medical students; the circumstances connected with the case were these: Mr. Moon, the patient, had applied to an eminent sur-

geon of Cleveland to have an operation performed on the os calcis, which had become carious from an injury received from a threshing machine. An examination was made, and the patient was informed that his foot would have to be amputated, as the conditions were such that it could not be saved. The gentleman refused to let him amputate it, but went to Dr. Hamilton, of Buffalo, who, having been informed of the previous decision, made an examination, and as promptly said it could be saved and be as good as ever. On presenting the case to the class he addressed them in these brief but impressive words: "Gentlemen, any *butcher* can *cut off a leg*, but the true *province* of the surgeon is to save legs." And he did save the limb, and Mr. Moon has it to-day as good as it ever was. Dr. Hamilton's address to his class was short, but it contained truths that I wish were indelibly imprinted on the mind of every surgeon and dentist in the world. To save! save! and not destroy the creations of GOD, is the province of the true dentist, and, until we do this, we shall fall short of performing our whole duty to GOD and our fellow men. It made little difference to the first surgeon if Mr. Moon lost his leg, but to him the saving of it was a matter of serious interest. Our relations with our patients are precisely the same. It is of no account to us, personally, if they lose their teeth, for we can, probably, make them false ones—as truly false to every attribute of the natural organs as their name can possibly indicate. But to our patients the matter is different. If we destroy the teeth GOD has given them, when they could be saved, we have robbed them of organs that we can never replace with rubber and porcelain.

From our experience with os artificial, we have come to the conclusion that ninety pulps out of every hundred, under favorable circumstances, can be saved; and the especial duty of the dentist is to save instead of destroying them. Dr. Atkinson, of New York, says that he never purposely destroys a pulp, and that the dentist is weak or wicked who would do so. In the doctor's opinions I fully concur, for I feel that we as a profession, and I as an individual, have too often been weak and wicked enough to destroy, not only pulps, but teeth, and whole sets of teeth, that might have done their owner's mastication well for years.

And now, gentlemen, if we have been sinners in the past, there is more reason that we make amends in the future, by so regulating our practice toward pulps and teeth that they may live and not die. And my desire is, that perfect dental knowledge and the laws of health may become so well understood and practiced, not only by our profession but by the masses of the people, that the time may soon come when tooth extracting shall be practiced no more.

MECHANICAL DENTISTRY.

BY J. G. TEMPLETON, D. D. S.

[Read before and published by request of the State Dental Society of Pennsylvania.]

The restoration of the organs of mastication by artificial means, comprises by far the greater part of the art implied under the term of "mechanical dentistry," which we have chosen as the subject of a few remarks, in the form of an essay, that may serve as the beginning of a discussion upon a subject forming an important part of our specialty—though much neglected at the present time by many of the best minds in the profession, the consequence of which is, that one particular branch of the science of dentistry has outstripped all the rest in the scale of advancement, while that under consideration has been left, for the most part, to be performed by unskillful and unscrupulous pretenders, calling themselves dentists, who, in some parts of our country are so esteemed by the public, and considered equal to the best men in the dental profession, which is the direct result of a want of knowledge on the part of the masses of the people, as to the proper qualifications of a dentist; hence the mountebank finds a ready market for his stock in trade.

In order to change this state of things, we must not only educate the public mind in regard to the training necessary for the dentist, but we must give to mechanical dentistry that attention which its importance demands, and not allow the wishes or opinions of our patrons to intimidate us from recommending those materials to which the quack is a stranger, and the proper manipulation of which cannot be learned in a few days.

In the discussion of this subject, we shall confine our remarks to the objects to be gained in the insertion of an artificial denture, and the means of its accomplishment; and next, the merits of the different materials that are or have been used as a base for artificial teeth.

And first, the object to be gained other than the mere insertion of an artificial denture, so that it shall suffice the purposes of mastication and articulation, should be the restoration of the features, as near as possible, to that natural expression of countenance of which the patient has been deprived by the loss of the natural organs, and the absorption of the alveoli.

To successfully perform this very important part of mechanical dentistry, the face of each patient must be studied with greater precision than is required of the portrait painter, whose only object is to produce a picture of the face as it is, while the dentist must and is expected to reproduce the face to its original contour, which requires more ingenuity than that exerted by the photographer, who merely catches the shadow of a face, prints it upon paper, and *he* is called an *artist*.

The artistic reproduction of the desired natural expression, is effected by moulding a wax plate upon the plaster model, and trimming so that it shall fill up sunken parts when placed in the mouth, when the expression of the countenance is to be noted, as also the proper length of the teeth required; and if, after thus experimenting, any change is deemed advisable, it can readily be made upon the wax plate, and the effect observed on replacing the wax in the mouth; then, if satisfactory, the bite is taken on the wax plate, from which models are made, on which to arrange and antagonize the teeth in such a manner that they shall correspond in contour to the wax plate.

Having proceeded thus far, the next consideration is, what materials are best adapted to our purpose; then, if the case is a partial set of teeth, we would use a gold plate, upon which we would mount block teeth carved expressly for the case, though in such cases we can usually accomplish all the restoration necessary by using the single teeth, such as are furnished by the manufacturers; and here we take occasion to say, that in no case would we recommend any other material than gold for a partial set; and if our patient was not willing or able to pay for the gold, then would advise the use of a plate of pure silver, alloyed with platinum, as the next best material.

Our reasons for advising these materials for all partial cases are, that they possess greater strength and occupy so much less space in the mouth, and also afford a much better return for the money expended by the patient, being more durable than the so-called cheap materials much used at the present time.

Again, we will suppose that our case is a full set, to be inserted on a gold plate; then the necessary amount of restoration cannot always be effected by using the common, plain or single gum teeth. Such cases are often most beautifully supplied with blocks carved especially for the case, and soldered to the plate, the artistic effect thus being at the will of the operator.

While gold as a base is admirably adapted to the purposes of the artistic or mechanical dentist, yet we cannot award to it the highest place as a base for full upper or under sets of teeth—"the want of cleanliness being a serious objection to its use, which is only imperfectly overcome in the combination of gold and hard rubber."

In "Allen's Continuous Gum Work," we find our ideal almost perfectly attained by its use. A very complete restoration of form and substance can be accomplished, as the porcelain body and enamel can be built upon the platinum plate to any desired shape or degree of fullness; we also get rid of that stiff, regular, artificial appearance of the teeth, as they

can be arranged in any position which the taste or judgment of the operator may suggest, to secure a pleasing expression.

While speaking of continuous gum work, it is with pleasure that we recommend to your favorable notice a modification of the same, by Dr. Moffit, of Harrisburg, Pa., which he offers to the profession under the name of the "Non-sectional Block Work," and free of charge to all who will use it—a degree of magnanimity not usual among inventors of the present day and generation.

In many parts of the country, the porcelain or mineral base is still growing in favor; for strength, beauty and cleanliness, it is not surpassed by any class of work yet introduced to the profession. The natural expression of the mouth, as well as the contour of the face, can be restored by it, as well as with continuous gum work, so justly popular; and, unlike the latter, it can be ground away, if it should be found too full in any place after it is baked, and afterward covered with a coating of gum, that will fuse at a lower heat than the gum previously used.

As a general rule, an upper set can be ground to a cast of the mouth in about the same time that will be required to grind a set of blocks for rubber work. When it comes from the furnace it is ready for the mouth, except the grinding; therefore, there is no filing, stoning, or lathe work required to finish it.

We have been situated where we could observe the success of this class of dentures for the last 12 years, and think, (though, in most cases, in the hands of incompetent men,) it has given good satisfaction to their patients. Being a good conductor of caloric, the mouth keeps as cool and healthy as with gold or continuous gum work, and it is not as heavy as either.

The next and last material which we would recommend for the purposes of restoration, is vulcanized rubber. The ease with which it can be manipulated to obtain the desired result constitutes, in our opinion, the only reason why it should be used; which, in connection with the low price at which it can be obtained, and at which it is served out to the public at large by the many would-be and so-called dentists of the present day—themselves the creature of its introduction—constitutes the main reason for its almost universal adoption as a base for artificial teeth.

One great objection to inserting such a mass of rubber as would often be necessary in restoring contour, is the deleterious effect it has upon the mucous membrane in the mouths of a great many persons, caused by its non-conducting properties. This brings us to the true explanation of the mischief wrought by vulcanite—not because it has failed to sustain the promise of usefulness it first gave, for its merits are such that, for certain important uses, its place cannot be supplied by any other known material; not because of the annoyances of the Goodyear patent agents—although

these are serious enough and have led to much demoralization—but because dentists themselves have failed to recognize the true value of the material, and they have made an incidental quality its prominent advantage, and their real motive for using it, namely, its cheapness.

They have used it thus in that under-bidding of rival practitioners, which is the burning disgrace of dental practice. They have advertised their cheap wares to the world till the community looks upon vulcanite as a material which costs nothing, and think that the work spent upon it has not much more value; whereas, ten years ago they could scarcely overcome a patient's prejudice in favor of gold, now they have so thoroughly demoralized the people that they will not have gold when the necessity of the case requires it.

Were it merely a question of cheapness it would not be so serious, for it is a maxim of political economy, that he is a public benefactor who reduces the cost of articles of necessity; but it is no benefaction when the value is reduced in like proportion, and it becomes an imposture when the value is still more reduced. Cheap dentistry is like dollar stores and gift enterprises—you may possibly get the value of your money, you most probably will not. Now and then a dollar may buy ten dollars' worth, but in the long run the inevitable laws of barter will prevail, and the dollar will only buy the dollar's worth.

There is no more certain law than that cheap work leads to bad work. If proof of this were needed in dentistry, look at the shapeless, inartistic, badly-fitting lumps of rubber stuck over with staring bits of porcelain, which issue from a thousand dental offices—*false teeth*—most appropriately so named; false to every idea of truth, beauty and fitness; made by men false to all proper sense of professional pride and duty; worn by persons false to their own self-respect and dignity, in permitting themselves to be thus disfigured and made ridiculous.

A dentist who is mean enough to get work by underbidding, will be dishonest enough to make it correspond to the price; and this has come to be a common, and, alas! an accepted excuse for not doing what the case requires: "I cannot afford it at the price I get." Hence, cheap dentistry is dishonest dentistry, when the price is such as to prohibit the fullest exercise of skill.

A dentist who works at prices which demand unceasing toil to earn his daily bread, leaves himself no time for mental culture; his work becomes a drudgery, in no respect more elevating than that of a common day laborer. Hence, cheap dentistry is degrading dentistry.

We sum up our charge against vulcanite—or, more correctly, its abuse —in that its cheapness and a certain facility of construction has tended greatly to foster cheap dentistry, and so make the dental art slovenly, dis-

honest and degrading; it has been so used as to lessen the demand for art and skill, and to encourage a community to prefer economy to artistic workmanship.

Let us hope, that when specie payments shall have been resumed in our country, cheap vulcanite work will have breathed its last, and both mercantile and dental worlds have new life infused into them by a return to the old-fashioned GOLD BASIS.

NEW CASTLE, PA.

AMALGAM.

BY CHARLES H. BAGLEY, D. D. S.

(CONCLUDED.)

The loss of health is undoubtedly one of the greatest misfortunes that can befall a man, and he who knowingly does any unnecessary thing which endangers in the slightest degree the health of another, deserves to lose his own. No matter if it has been done ninety-nine times without apparent injury, the risk is always present, and the hundredth time may prove to be the evil time. Moreover, the probabilities are that harm is actually done in many cases which the operator never hears of again, and when even the patients do not know the cause of their sufferings. It is even possible that some who use this material habitually, and almost exclusively, do not desire to know whether any evils result from their operations or not, but say to themselves that "where ignorance is bliss 'tis folly to be wise."

Having considered amalgam with reference to its general constitutional effects, I shall now inquire into the influence it may bring to bear locally on the teeth. When amalgam is present in the mouth, we have all the conditions necessary for the excitement of galvanic action. There are one imperfect and two perfect conductors, a fluid acting unequally on two or more metals. The surfaces acted on are small, to be sure, but they are very near to each other, and the quantity of electricity varies inversely as the square root of the distance. The chemical action of the saliva on the metals is not so vigorous as that of sulphuric acid on zinc, in an ordinary battery, but it has plenty of time in which to work, and with time enough what may not be accomplished, even by feeble powers? The coral insect, in the course of ages, can make islands and continents, as well as the volcanic power of subterranean forces can accomplish the same in a day or week. A drop of water falling the distance of a few feet on the head of a man, causes a trifling sensation, but the same process continued steadily for hours constituted one of the most horrible of the tortures of the Spanish inquisition. A drop of water falling on a

block of granite makes apparently no impression, but "continual dropping weareth away stones" is a proverb. Burdens which, in the morning, seem "trifles light as air," having been carried all day, at night are heavy as lead; and examples might be multiplied. Hence, it is not unreasonable to infer that galvanic action, even though feeble, being once set up by permanent causes in the mouth, important results may follow. Let us see what some of them may be. The integrity of the filling itself may be impaired, when caries of the tooth will naturally follow, for the saliva, or some of its constituents, water among the number, being decomposed, oxygen is set free, and may corrode the metals forming the amalgam. Chlorine is also liberated, and may form chloride of tin or chloride of mercury, both of which are soluble; and, being dissolved, are removed from the filling, leaving it porous and friable, allowing the fluids of the mouth to pass through and around it—the decay of the tooth is inevitable. This action may, however, be partially arrested by the deposition of nearly insoluble oxide or sulphuret of mercury on the surface of the filling.

The teeth are injured by the acids formed by the union of elements set free by galvanic action. All articles of food that are convertible into animal tissue must contain nitrogen, "which, among all the elements, may be called the least decided in its affinities, that which maintains with least tenacity its combinations with other elements. * * Such, indeed, is the instability of animal compounds, arising from these peculiarities, (the presence of nitrogen and water,) that in dead and moist animal matter, no more is requisite for the occurrence of decomposition than the presence of atmospheric air, and a moderate temperature, conditions so commonly present that the decomposition of dead animal bodies appears to be, and is generally called, spontaneous." Keeping this in mind, it is easy to see how a supply of free nitrogen is furnished in the mouth. Not one person in a thousand brushes his teeth after every meal; a still greater number do it only once a day. Multitudes, not thinking that cleanliness is next to godliness, perform this important operation only once a week, before going to church, while the "great unwashed" ignore the tooth-brush altogether. Particles of nitrogenous food being thus allowed to collect around the teeth, are decomposed, and nitrogen is evolved. Nitrogen is also furnished by the albumen in the mucus. The galvanic currents induced by the saliva and amalgam, or these in conjunction with gold fillings in adjacent teeth, decompose the compounds of the saliva, liberating oxygen and hydrogen. The nitrogen and hydrogen having a liking for each other, at once embrace, forming ammonia NH_3; but jealous oxygen interferes, the lovers are rudely sundered. Nitric acid NO_5 appears

upon the scene, and immediately commences operations on the tooth structure. The results of his labors at sapping and mining are well known.

By referring back to the analysis of saliva and mucus, it will be seen that chloride of sodium is formed in the former, and the chlorides of sodium and potassium in the latter. The little galvanic battery having been set in motion, the simple compounds of the electrolyte, saliva, are decomposed. Chlorine being divorced from his two wives, sodium and potassium, seeks a new affinity without delay. He finds her in hydrogen, and the twain being made one, forth comes hydrochloric acid, HCl, armed and equipped for destruction.

This acid may be formed in many other ways in the mouth, but they have no connection with the subject of this essay. This, more than any other known acid, is injurious to tooth structure, readily and rapidly decomposing the carbonate and dissolving the phosphate of lime. It should be guarded against by all the means in our power. Instead of doing this many dentists, in defiance of the laws of nature, establish a manufactory of the acid in the mouth, which, having been started, continues running, often until the machinery is worn out.

The galvanic action, set in motion by amalgam, reminds me of the renowned Dón Quixote de la Mancha, who, not knowing what he was doing, liberated a gang of galley slaves. The freedmen, by way of showing their gratitude, belabored the valiant knight till he dropped senseless on the ground, and then dispersed to plunder the inhabitants of the neighboring country. Amalgam having started the current, is itself injured while the teeth are destroyed.

It has seemed to me that in my experience in dentistry—not, as yet, very extended—I have met with more cases of periostitis, ending in alveolar abscess, in connection with teeth filled with amalgam, than with teeth in any other condition; and when, as in other cases, a preparation of mercury, if administered in the earlier stages, in the majority of cases seemed to produce a decidedly beneficial effect, in these cases it made no favorable impression whatever, as might be expected if the disturbance was caused by amalgam, for mercury could hardly cure a disease caused by mercury. If the disease was caused by mercury, the latter was probably absorbed through the pores of the tooth. That this is possible, may be inferred from the deep discoloration often found under amalgam fillings, and from the disturbances caused by arsenious acid placed in carious cavities to remove sensitiveness of dentine, or to devitalize the pulp.

There is still another way in which amalgam fillings may indirectly injure the teeth, and that is, by shrinkage. This shrinkage frequently occurs, and the fluids of the mouth then enter between the filling and the

walls of the cavity, are there decomposed, discolor the tooth, and cause caries.

I am willing to admit that, in the majority of cases, we see no constitutional disturbances resulting from the use of amalgam, but the danger is always there, and it seems to me probable that such symptoms may exist without being noticed by the dentist, or, if observed, that they are not assigned to the true cause; the slow and gradual nature of the process assisting to mislead, and, possibly, also, another peculiarity of mercury, concerning which I shall quote the following passage from Dr. Piggot's work on Dental Chemistry: "The dose of mercury which produces its peculiar effects, is well known to be extremely variable. The probability is that, except in rare cases, but a small portion of it ever gets access at any one time into the economy. The effect experienced is not that of the last dose, however large, but of all that has effected a lodgment in the tissues. The recent observations of Melsens and Budd have shown that both *mercury* and *lead*, even in the *form of insoluble salts*, may *remain a long while combined*, as it were, with *the tissues*, producing varied phenomena of disease, and then be *set free* by iodide of potassium, so as to enter the blood, and produce their specific primary effects upon the organization. Now, if these insoluble compounds are capable of producing so much mischief, by what possible process of reasoning can any one arrive at the conclusion that metallic mercury, which we all know to be soluble in the fluids, will prove inert?"

The habitual use of amalgam has a demoralizing effect, engendering laziness and destroying professional pride, just as life in a tropical country, where the necessities of life can be obtained with very little labor, fosters indolence and destroys ambition. When the operator meets with a difficult case he uses amalgam, and the more he does it the more he is inclined to do it, until this laziness becomes a fixed habit. Men easily become slaves to habits, and it is easier to move mountains than to change these same habits. The operator takes no pride in these fillings, because there is nothing in them to be proud of, but little skill being required for their insertion; hence the great carelessness often seen in the use of amalgam, and a frequent cause of failure to protect the teeth. The general result must be a great decrease in skill and professional standing.

I have endeavored to show that, as a general principle, we should not use amalgam for filling teeth when we can avoid it; but there are exceptional cases where it seems to be the only material that can be employed. We sometimes find cavities where it is impossible to insert a satisfactory gold or tin filling—one that will protect the tooth from decay; yet, the tooth is too valuable to be sacrificed. In such cases, it is sometimes well

if the patient can be trusted, to use some temporary filling, as oxy-chloride of zinc, and renew it when necessary. If this cannot be done, we must choose between two evils: either to lose the tooth or use amalgam. I think we should be justified in doing the latter, and taking the risk; but can think of no other case in which it would be proper to do so.

When we undertake difficult operations, and are wearied or unwell, the temptation is strong to use amalgam, avoiding the obstacles in our way, instead of grappling with and overcoming them. At such times we have opportunity to prove our steadfastness and resolution, to our own satisfaction at least; for no man can be sure that he possesses virtue until he has withstood temptation, no more than he can know that he is not a coward until he has met danger face to face.

"Every science has its difficulties," and dentistry is no exception to the rule; if it was, it would not be worth much; for the road to knowledge and skill is as narrow and difficult as the path to virtue. "Do what you ought, happen what may," is a Dutch maxim, applicable to this case.

We should, then, continue to work on with the best means at hand, despite the difficulties in the way, hoping that at some future time a substance may be discovered which shall combine the excellent properties of gold with the plasticity of amalgam, without the undesirable peculiarities of either, but possessed of attributes which exist in neither. "It is a consummation devoutly to be wished for." It may not come to light in our lifetime, but some future generation may find it and enjoy it; for, says Hippocrates—

> "Life is short, and Art is long;
> Occasion fleeting; Experience fallacious,
> And Judgment difficult."

Many a failure and disappointment will be met with, but I doubt not success will come at last. Meantime we have that excellent material, gold, and when it is too expensive, tin, with which we can exercise our skill, and furnish respectable protectors of the teeth,—surely much better than a set of rowdies fighting together in the dark; for it is a true, if trite saying, that "Evil communications corrupt good manners;" and tin, a placable and well-behaved character, when alone, if brought in contact with mercury and other metals in amalgam, only helps to make confusion worse confounded. Where simple tin will serve our purpose so well, if we add to it mercury, we shall surely have one of those cases where even a *little* more than a little is much too much; for, as Sir Isaac Newton says: "More is in vain when less will serve; for Nature is pleased with simplicity." *Simplex munditus* is an excellent motto, and especially applicable to gold as a material for filling teeth.

MEADVILLE, PA.

ASSOCIATION AS AN ELEMENT OF IMPROVEMENT.

BY SAMUEL WELCHENS, D. D. S.

[A public Address, delivered before the citizens of Pittsburg. Published by request of State Dental Society of Pennsylvania.]

In no age of the world has there been so much attention paid to the formation of associations for mutual benefit and improvement as the present.

History is so blurred and blotted with the iron rule of despotism that the very instincts of man lead him to prefer habits of isolation and selfishness, rather as a medium of protection from the persecutions and inhumanities of the rulers, in those earlier days, than to claim the benefits of society where so much jealousy and oppression seemed to be the controlling element, and where the social attributes of the home circle, in many instances, proved to be a certain passport to the block, or the torture rack of the inquisition.

The tyranny of public sentiment, the dark designing prerogatives of government, and the superstitions and cruel infatuations of the church, have each, in turn, so emulated one another, in deeds of cruelty and oppression, that the individual in those days must have been bold, indeed, to have so far disregarded the principles and tendencies of either, as even to contemplate a movement towards fraternal intercourse within their borders.

There is, perhaps, no better settled principle in history than the quickening, jostling, progressive energy, awakened by those *associations;* and this alone, when the very outposts of despotism rested essentially upon the ignorance of the people, was enough to call down upon the very idea of such improvement the anathemas and oppression of institutions which could not live a moment, except upon the scattered fragments of society and the bonds of ignorance and superstition.

Association, unity and harmony, have ever proved a most formidable bulwark to civil and religious liberty, and that expansive development of scientific and intellectual improvement, which has raised the world from heathenish darkness into the broad, open sunlight of progressive development.

Powers and principalities, therefore, as well as the moral and intellectual status of society, are alike influenced by this balancing and improving element. The asperities and anarchies in governments rarely disturb the evil purposes of the despot; but the *association* of his subjects for improvement and culture strips him of his regal robes, and makes him tremble on his throne.

The very occasion which gathers a people together gives character and expression to their actions, but the achievements and results of their

councils gain strength and power in proportion to the energy they exercise in their deliberations. Patriotic hearts, assembled to solemnize the day on which their freedom was announced, are bound together in mutual sympathy, and with heads erect in the proud consciousness of equal rights, the air swells with the loud acclaim of their joyous voices, as they repeat, in stirring accents, the immutable truth that man was born to be free. But it is in their *associated sympathy* that the compact is sealed, and that the transaction is characterized with the forces and powers of perpetuity.

All this accords well with "the eternal fitness of things," for there is a law in the economy of nature which subordinates every species of growth and improvement to the element of dependency.

No principle is more palpable, and no power more effective in its complete conformity to that rule of life that makes one object active and energetic, and another slothful and negative. It runs through all the relations of nature with a talismanic influence, and harmonizes all discrepancies, smooths all disparities, and gives an earnest, positive, progressive energy to every interest, whether utilitarian, scientific, civil or religious.

Association consolidates, establishes, renovates, sharpens, sustains and develops every business enterprise, pursuit or profession, and every scheme of a moral or religious character that seeks its stimulating and renovating power. With it, the race of mankind is at once raised to dignity and prosperity; without it, selfishness, discord and anarchy rend asunder the proud fabric of human enterprise, and as the planets of the solar system, deprived of the forces which keep them in their respective orbits, would break away into wandering meteors, so would the social system crumble into withering fragments, and fly off into isolated selfish particles, as scintillations are emitted from the consuming metal. It is to the intellectual world what the law of gravitation is to the physical, and no other instrumentality can so develop the finer and higher qualities of the mind, as the comparison and interchanging of views and ideas. "As steel sharpeneth steel, so the countenance of man sharpeneth that of his brother."

If we analyze the fertilizing influence of the spirit of those associations, and contrast its virtues with the sordid elements of abstract individualism, we will see at once how largely it enters into all the relations of life, and how happily its results compare with the repellent characteristics of selfishness.

In a scientific point of view this law of dependency or association is of paramount significance. Chemistry, electricity, the laws of gravitation and cohesion, the conditions of growth in vegetation, and all the laws of affinity, by which separate and distinct elements are brought together to form systems and construct fabrics, rest essentially upon it.

A chemical compound, for instance, is composed of two or more elements, and as such it is capable of acting in *itself* as an element in many of its

combinations. But without the association of those elements there could be no chemical change or equivalents, and the science would fall as a dead letter by reason of its incompetency.

A germ contains all the principles necessary to develop the towering oak; but this principle of dependency upon correlative agencies, calls into action moisture, heat, light and the gases of the atmosphere as essential conditions of vegetation, without which there could be no growth, and the germ would remain forever but a particle of inert and worthless matter.

The solar system is composed of myriads of worlds and planets, with no special sympathy or affinity with each other, and if destitute of correlative forces, or if influenced solely by abstract repellent isolations, they would wander in the immensity of space, and destroy each other by forceable contact, or terrible explosions, occasioned by the approximation of volatile and heterogeneous gases. But by the *association* of the law of gravitation, with the elementary and chemical equivalents of the atmosphere, and the centripetal and centrifugal forces, each planet is held in its respective orbit, systems revolve around systems in perfect harmony, and this order of the universe becomes another important witness to the efficacy of association in every department of nature.

No structure, whether organic or artistic, can attain to any degree of usefulness or perfection without it: and all through the labyrinths of professional science and historical research, in government, in moral and physical culture, or even the minor details of life, no great or brilliant results have ever been achieved where the power and efficacy of *association* have been ignored.

Even the language, habits and movements of individuals are influenced by it, and are fraught with happy, graceful results, or awkward, halting, slothful characteristics, just in proportion to their facilities for associated intercourse with kindred spirits.

Education is but a systematizing of the faculties and powers of the mind, so as to enable it the more readily to grasp and analyze the great problems of life as they present themselves in varied forms before us. But no system of education could ever prove to be successful in the accomplishment of such ends, if it were founded upon abstruse and isolated abstractions. The finer and purer and more useful triumphs of science are the true component elements of education. But they are strengthened and sharpened and established alone through the stimulating energies of *association.*

My object is to apply this philosophy to the formation and workings of association, in the development of the learned professions, and more especially to that of *dentistry.*

In all the essential requisitions of improvement in any profession, these

societies have a leading and powerful influence. It is not only in scientific culture that improvement is felt, but the *social* benefits are of incalculable value.

If the interests and dignity of a profession are to be advanced, and its standard of excellence elevated, it is most important that a laudable emulation be encouraged among its members to incite them to earnest inquiry and a progressive individual energy. *These* are the elements of improvement and success, but they have no fellowship—no growing affinity with the characteristic attributes of a mean *prejudice*.

If they are to have a free untrammeled exercise of their powers, the corrupting influence of *jealous nature* dare not contaminate the soil designed for their propagation. But a cordial cultivation of the higher powers of the mind, and the nobler impulses of the heart, through an intimate acquaintance and friendship of the members of our craft, one with another, as is the tendency of those societies, is the surest method of propitiating those baser and sinister tendencies, and of opening the way to dignity and manhood.

The first step toward such a movement—the mere desire to unite in such an enterprise—is of itself the exercise of an energy in the direction of that noble endowment of the heart, which does not only make us better members of our *profession*, but better citizens and more useful members of society.

Those petty jealousies and disreputable business prejudices which enter so largely into every community, and become so baneful in almost every business enterprise, are nowhere so reprehensible as among members of the same profession, especially those who hold positions of respectability.

They retard the progress of intellectual and scientific improvement, and destroy every incentive to research and discovery, thus losing to their profession the acumen of their minds and experience, which, if under better discipline and a more hopeful influence, might add honor to themselves, and useful and brilliant acquisitions to their vocation. To nurse and indulge such a spirit is the most certain way to destroy a man's influence for good ; for it renders him morose, sullen, designing and selfish, with no good word for any one and no praise, save for himself.

Instead of those higher qualities of his being, of which we have just been speaking, sordid avarice takes possession of his life, and improvement, that should flow from his participation in any scheme or compact of social intercourse with his neighbor, is nowhere to be found.

Such men are sometimes found in the liberal professions ; but they are rarely seen in associations formed for the advancement and improvement of such profession. If they come in at all it is to obtain position, or to have some honor thrust upon them, which they had not genius or energy to call forth themselves. Disappoint them in this, or fail to make leaders of them, and they again retire into their wanton, *slothful* and *selfish habits*.

Contrast the life of such a narrow-minded, hide-bound individual, with the full, free, open expanse of a being whose life and habits have been trained in the school of fraternal intercourse. One who enters a profession to reflect honor and credit upon it, and who comes into every measure designed to prove his love for his calling, and a mutual benefit to both, and the advantages of those associations stand out in bold relief.

He is thus qualified to meet his patrons, not only in the routine of scientific competency, but as a *conscious gentleman*, *easy* and *affable* in his manner, *sympathetic* and *tender* in his *bearing*, with more of a desire to do them good than to get their money, and he will meet both the requirements of his profession, and the wants of the public in such a manner as to insure him a useful and brilliant career.

We will now turn to a contemplation of the real substantial benefits of those societies in a scientific point of view.

Professions are not made, they grow. They are either adventitious buds from some parent stem or trunk, or they are regular growths from germs lodged in the rich prolific soil of science.

They are thus creatures of circumstances and conditions, and require nutrition of a substantial character to secure their development, just as much as the growth of a vital organism would. A profession cannot live upon abstract theories and isolated dogmas. There must be an orderly and progressive exercise of the elements of growth and improvement, in order to establish an energetic and *hopeful status.*

Dentistry, though a branch of the healing art, is, nevertheless, a profession of legitimate birth. It was practiced as a distinct branch of surgery by the *Egyptians* as far back as 1200 years before the *Christian era*, and the complications of the teeth with the adjacent parts—their important position and the character of their function as organs of the highest type of structure, gave it as a separate branch of surgery the very highest position in the role of professions as then practiced.

Like other objects of growth, *dentistry* may be said to have three several stages of development. The first we will designate as that of *infancy*. The second of *youth or pupilage;* and the third, (though in a comparative sense,) that of *maturity*.

We characterize the remote history of our profession as an infantile stage, because, in being confronted with the stern realities of diseased and aching teeth, the ancients, in their remedies for those "distempers," as they styled them, exercised far more superstitious quackery, which seemed to be the result of ignorance and inexperience, than scientific, or even common judgment, in which an advanced stage of development might be evinced.

The malady then, as now, was, no doubt, as *excruciatingly mature;* but

the remedy, either as medical or surgical, was of that order as to stamp it with the *imbecility of infancy*.

Genius and correct *scientific theories* were not wanting in those days; but the prevailing superstitions led to the most ridiculous expedients, and true skill and science, (which are always modest,) were kept, to some extent, at least, in the back ground.

There were then, as now, two elements striving for the mastery. The one was the honest promptings of the true devotee of *science;* while the other reveled in an atmosphere of quackery, and taking hold of the crude ideas of the people, *the latter* has always been the most successful.

The faint glimmering of science in those, say: "I know well that many believe there is no better remedy for toothache than extraction; but before proceeding to that there are many other remedies that may be successfully employed. It is not necessary to proceed at once to extraction, even though caries exist, for, by removing the decayed portion of the tooth with a sharp cutting instrument, such removal causing no pain, whatever remains is as sound as a perfect or healthy tooth."

Quackery was equally solicitous about retaining the tooth, probably on account of their inability to extract them, but less scrupulous in its restoration to health.

Accordingly, there were amulets and other superstitious means employed to allay the pain; and not unfrequently such ridiculous notions as the following would be entertained and resorted to, as expedients, for the want of better theories by which to humbug the people. "The tooth will drop out by itself if it be rubbed with *African sponge*, but care must be taken not to meddle with a tooth which is healthy."

The aversion to the extraction of the teeth gave rise to many curious expedients to get round a most difficult and dangerous task, and accordingly they resorted to the actual cautery, in the use of hot iron and brass needles, and hot oil and butter to destroy the pulps of painful teeth, and "numerous caustic medicines, the intended effect of which was to make the teeth exfoliate," and thus they would destroy them rather than extract them.

Teeth were filled, too, with lead in those days, but the object seemed more for the purpose of strengthening them for the operation of extraction than to preserve them from further decay. For stopping them when carious, a sort of gum was used, or the decayed part was scooped out with a common scalpel. This sort of treatment was in vogue in the days of *Celsus*, who flourished about the commencement of the *Christian era*.

This slow progress in the healing art, from the time of *Æsculapius* to the days of *Celsus*, a space of about 1200 years, shows the scientific animus of those earlier years, and is a fitting commentary upon the *virtue*

and *power* of *colleges* and *professional societies* to carry forward and upward that matchless development which has characterized the present age, and the *latter-day glory of the scientific world.*

At a still later date we have accounts of artificial teeth being set on wire, and carved out of ivory, but to what extent this practice was carried we are not informed.

The history of those ages is but a catalogue of this kind of practice, more or less ridiculous, and alternating between the devotees of science, even in its incipiency, and the crude notions of the ignorant and superstitious mountebanks, who seemed to be about as plentiful *then* as *now.*

This, then, faintly shadowed forth, is a glance at the infantile stage of our profession, and may be regarded as reaching, in this fashion, down to the beginning of the last century.

"In the year 1700 persons destined for the profession of dentistry were compelled, in France, to undergo a regular examination. It is from this period, perhaps, that we must date the establishment, in modern times, of the dental art, as a *distinct branch* of medical practice;" and from this time forth its pupilage may be regarded as in vigorous and successful operation.

We have neither time nor space to dwell upon this part of our subject. It is not important that we should, but the superstitions of the ancients, and this narrow, time-serving jealousy, of which we have already spoken, seems to have been inborn elements with those who presumed to practice in a profession which has always been too lenient and too easy of access. *Accordingly,* it is not beyond the recollection of some of our oldest practitioners, when this spirit still reigned supremo, and for a man of ordinary intelligence and genteel address to enter a dental office, would usually produce considerable commotion. There would be as much nervous perturbation and smiting together of the knees upon the part of the operator as that of the patient.

The latter would quake and tremble for fear of the jaw-breaking operation of extracting a tooth; whilst the former would tremble and quake, lest the latter would *steal the business.*

There was thus any amount of jerking, dodging and rapid nervous concealment of instruments and appliances, lest quacks should spring up, and, by their bungling work, cheat the people out of *money and teeth both.*

If one of those characters chanced to discover a *new thing,* whether forceps or file, or excavator, hand-mirror, chair, or even *tooth powder,* he would straightway get a *patent* for it, and *woe* to the *infringer thereof.* The indignities and anathemas of the whole civil code would descend upon his devoted head, with a certainty and severity which would put to the blush the *prettiest efforts of old Josiah.*

They also exercised a commendable *solicitude,* not only for the *protection*

of their *patients* against bad work, but against exorbitant charges also; and lest the *dear people* would, in some way, be *cheated*, they would *insure their work*, or *give it out on trial*, and emulate each other in establishing *starvation prices*. Some of these habits, I am sorry to say, have followed the profession even into maturity.

As the youth grows and his mind expands, so the *profession has grown*, despite the efforts of some of its slothful and unprincipled members to drag it to the earth, in endeavoring to make it subservient to their own *aggrandizement*.

Its final stage of development, however, may be gathered up in the present advanced condition of these two ideas, namely: The course of study necessary to a complete dental education, as demanded by the scientific spirit of the present age. The second is that high-toned *social code* which is more directly developed by those *associations*.

These combinations draw in every element of improvement. Instruction in the private office should be directed with a view to a thorough and complete collegiate course; and the instruction there should again be followed and established by the discussion of social and scientific benefits of our *local*, *State* and *National societies*.

There are here facilities for every species of instruction and information, and he must be a *drone indeed*, who does not grasp the helping hand which is thus stretched out to render such important service upon such *easy terms*.

Another most important element in this process of improvement is a substantial and efficient *literature*. Where a disposition to improve in a literary culture is wanting, a high-toned standard of excellence cannot be attained. No practitioner, however well his mechanical manipulations may be performed, should be recognized as such, unless careful attention be paid to such study and research as will keep him up with the progressive spirit of his profession. If he stops reading, or *ceases* to be a student, *then should he also stop practising*.

This is the life *and light* of the scientific element in any profession, and for a drone to steal in and bring disgrace upon his calling by a criminal imbecility, as the result of an ignorance superinduced by indolent habits, is an outrage, not only upon the profession, but the community at large; and mal-practice, arising from such pretensions, should be subject to *severe legal prosecution*.

The idea, then, of a *mature profession* is not to *cut off* all the resources of development and progression, but so to *arrange* and *harmonize* them as to make them more *efficient*.

It is so to use and handle the appliances to which I have averted, (and the most potential of which I contend to be those societies,) as to fortify all the weak points and outposts of our profession, that it may prove to

be our *castle*, finished and complete, towering above and beyond the *prejudices* and *jealousies* of the world of selfish business interests, and the floundering blunders of *professional charlatans*.

THE STATE DENTAL SOCIETY OF PENNSYLVANIA

Was organized under most favorable auspices, in the City of Philadelphia, in the early part of December, 1868; this being its second annual meeting.

The formation of this association should be regarded as complimentary, both to the profession at large and the people of this great Commonwealth.

It is certainly a source of commendation and congratulation to every man who loves his profession to know that it contains vitality enough to develop such promising evidences of prosperity.

The movement was not set on foot for selfish purposes or individual preferment. There were no dreams of future greatness being *thrust* upon any one who was not perfectly competent to bear such distinction, or willing to receive it.

The idea that it was to be formed in the interest of one local society in preference to another, or to the advancement of the reputation of one of its members over the worthy claims and aspirations of another, did not enter the mind of any of its founders. It was not intended that *Pittsburg* should be preferred to *Philadelphia*, or that *Erie* should claim more prominence than *Lancaster*, or that *Harrisburg* or *Reading* should present better and stronger claims than *Williamsport* or *Chambersburg* in the dispensation of its benefits. The material of which it was composed, and the spirit by which it was animated, were a little too independent to be *ruled* by one section of the *State*, or *ruined* by *another*. It is thus composed of that kind of material that rarely succumbs to ordinary trials, and *never cowers* at the *frowns* or *ridicules* of self-constituted dignitaries.

We say its organization was not prompted by any such sinister motives. It was not forced into existence by a few narrow-minded individuals, whose *aims* and *ends* were to establish a *central oligarchy*, whereby the sovereign character of our profession should be destroyed, or any local society or individual interest be subservient to a *focalization of power*.

But it *was* the result of an *open generous outburst* of the progressive energies of a profession which was *big* with the spirit and enterprise of the age; and the vitality which it has displayed, from the beginning, is the very best evidence that it was *born to live*.

The positive attributes of this *State society* are, that it was formed for the scientific and social advancement and benefit of every member of the dental profession throughout this *broad Commonwealth*. It was intended to draw together the best material and the best energies of the profession, thereby to constitute a *nucleus* to which other good material would gravi-

tate, and thus establish a status, not only upon a higher scientific *basis*, but upon surer and better moral and social principles than obtained heretofore.

It was thought that such efforts would be appreciated by those high up in the scale of honor and learning, and be commended and sought after by those who are striving for reputation and advancement in their professional pursuits.

The proposition being fair and honest, and honorable and beneficial to all, no one dreamed of a formidable opposition or of serious objection, especially among those who were well informed in regard to those redeeming qualities. This social and scientific compact was entered into by the best talent and some of the best men to be found in the State. With such antecedents, and the endowment of such energy as might reasonably be presumed to be thrown into the enterprise, we expect not only that the *State Dental Society* will prove to be a *success*, but that it will be a triumphant vindication of all that we have said about the benefits of those *societies*.

But the *people* have an interest in this matter. If we confine all the benefits of those associations to the members of our *profession*, we would defeat the main object of our argument. The improvement thus developed *concentrates* the energies of the profession, but it is to render more efficient service to those who require it. If a man embarks in a vocation, which so nearly concerns the health and comfort of the people of his community, it is not only his duty to avail himself of every source of information, and every appliance necessary to carry out successfully the pretensions of his craft, but it is the moral duty of the individual members of that community to not only countenance and encourage such schemes of improvement, *but they should demand* either the preparation and competency which he may obtain from every approved source of information, or his *retirement* from *practice*.

Now, my friends, if there is any one thing more despicable than another upon this broad earth, it is a *quack community;* quack *dentists*, quack *doctors*, quack *lawyers*, quack *teachers* and quack *statesmen* are plentiful enough everywhere, and *bad enough* in all conscience; *but a quack community* outstrips them all. I do not mean a community of quacks; such a thing is scarcely possible, since they are unable to live upon each other; *but a quack community*, a community of average intelligence and ordinary business qualification, that will submit to the jaw-breaking operations of an *ignorant* and *bungling dentist;* the life endangering practice of an *incompetent* and *self-conceited physician;* the ridiculous council of a *poor half-bred lawyer;* the feeble efforts of an *empty-pated teacher*, and the *dark designing chicanery* of a *mountebank statesman*, day after day, and

year after year, with no effort to throw off the *incubus*. This is what we conceive to be a *quack community*.

Why a system of fraud and quackery should be supported by any class of people is a question entirely beyond our comprehension. How it is that the natural bias of the public mind seems to gravitate to deception and humbuggery, rather than a proper appreciation of the scientific, the noble and the good, we cannot explain. Certain it is that there *are* antagonisms, and to reconcile them, especially in dentistry, is the object of the formation of our societies.

All that is necessary, to be guided properly, is, to seek information from reliable sources, what your doctor's *standing is in his profession*. A dentist or a physician may deceive the people, but he rarely humbugs the solid mind of his *profession* long. Nor is his diploma a sure test of his competency. Those who are graduates of colleges are not at all times our best operators. This, of course, is a leading qualification, but some of the greatest *charlatans* in the profession hold diplomas, and though good as a general rule, those diplomas are dangerous things in the hands of men who will *abuse* the license they bestow upon them.

It is not there *alone* that the profession looks in making up the estimate of a man's qualification to practice. It is his *faculty*, his *judgment* and his *genius*, and the moral bearing and attributes of character, *after* the advantages of a liberal professional education, which make up the totality of his *passport* to the higher and better judgment of his professional brethren; and *just here* he generally must come to become a member of those societies.

An out-and-out quack scarcely ever gets into our societies, and consequently a membership therein should be one of the *very best passports* to your *confidence and support*.

In the next place, note his standing in society. He may be a little *gassy* and *conceited*, (some of our best men are so,) but he must be *sober* and *solid*. The *brain* must be clear and the *hand* steady that wields an instrument or that compounds a prescription, or the individual that would presume to render you medical or surgical aid when in distress should be entirely *unworthy your confidence*.

Now, why should there *not* be a grand simultaneous movement of the dental profession throughout this *State*, and, indeed, throughout the country, toward a higher, more concentrated and more efficient standard of usefulness? Similar efforts are being made in every other department and enterprise in life; and that branch of the *arts* and of *science* that loiters, or shows itself to be a *laggard*, is unworthy of the age, *and ought to go down!*

Some years ago, at a literary entertainment, a distinguished scholar characterized Pennsylvania as a *sleeping giant*. He had reference, prin-

cipally *and especially*, to the cause of education. But in this, as well as in every other particular, it was a happy *simile*.

If we contemplate, for a moment, the various interests and the latent energies of this vast commonwealth, the force and power of the comparison will at once be apparent.

It is not only the mental powers in the educational interests of this *huge giant* which are dispelling the mists and drowsy scales from eyes and activities long *closed in slumber*, but its matchless resources in its *mineral*, *agricultural* and *commercial* features are being not only aroused, but developed into physical proportions, not only as a structure for its mental endowment, or as a peer among *other states*, but as a *veritable giant*, towering head and shoulders *above them all*.

Anatomically considered, the caricature is still more striking. Its mineral bones, its iron muscles and nerves of steel, and an epidermis of the verdure and rich soil of the earth, and wells of oil belching forth from its very bowels, attest the vigor of its heart of enterprise. Then see the rippling grandeur of its circulating system, in its majestic rivers, its numerous creeks and rills, and meandering streamlets, and the herculean labor of its hand in its railroads, canals and navigations, and engines of locomotion. All these present a physiological fabric well calculated to receive and develop the higher attributes of education, and a cultivation of the arts and sciences.

It is being beautified, too, is this sleeping giant, in its splendid cities, beautiful towns and hamlets, and gorgeous palaces, and the living green and foliage that covers its broad acres and towering hill tops; and the moving mass of living, working, justling beings that swarm every foot of its soil, is indubitable evidence of its being a *thing of life*.

To show the high character and nature of this giant organization; it is not like the brute, either *graniverous* or *carniverous*, but, like man, it is *both;* for in its repast it does not stop with the immense loads of its vegetable and agricultural products, but the "cattle on a thousand hills" are daily victims to its insatiable appetite.

Now, if there are societies, corporations and promiscuous gatherings in the interest of every other enterprise that caters to the taste, appetite and development of this giant, why should not dentistry take position side by side with the best of them? If, by the concentration of those interests, every part and feature is improved and sharpened, *why not sharpen the teeth also?*

If this idea is correct, and *that giant* is properly aroused, with an appetite sharpened by the slumber of a century, and you furnish his repast as above indicated, you will call down the anathemas of his vengeance if you do not furnish him with a good *healthy and efficient set of grinders*.

LANCASTER, PA.

A CASE OF INTEREST.

BY A. J. REDERICH, D. D. S.

The subject, a lady about forty years of age, came to have a wisdom tooth extracted. On examination, the buccal surface was found decayed much below the margin of the gums, which projected in and nearly filled the whole cavity.

After cutting sufficiently, the tooth was grasped and extracted, which was done easily. After laying it aside I took a look at my patient, whose mouth was opened quite wide.

Suspecting dislocatien of the inferior maxilla, I was about taking steps for its reduction, when she grasped her chin with her thumb and forefinger and threw the condyles in place.

I made inquiries as to this condition of affairs, and thought to get a little history; but, no, the whols matter, when summed up, was, that "*it was so ever since she could remember.*" At my request she disarticulated her jaw a number of times.

On examination, with my fingers upon the condyles during their passage from the glenoid cavity over the *emmentia articularis*, there was no great obstacle nor "hitching" against the malar bone by the coronoid processes, as is the case in dislocations of this kind. The appearance in front of the opening of the external ear showed great enlargement of the condyles, perhaps two or three times the ordinary size. A tumor would be suspected; but this moving backward and forward with the jaw, and passing forward and downward during the dislocation, and both sides being alike, prove enlargement of the condyles.

SIOUX CITY, IOWA.

Dental Associations.

SECOND ANNUAL MEETING OF THE STATE DENTAL SOCIETY OF PENNSYLVANIA.

Reported by Dr. G. W. NEIDICH, Recording Secretary.

The second annual meeting of the State Dental Society of Pennsylvania was held in the Board of Trade Rooms, in the City of Pittsburg, at 10 o'clock, Tuesday, June 21, 1870.

The President, Prof. T. L. Buckingham, being absent, Dr. George B. McDonneld, First Vice-President, assumed the duties of the chair.

Members present—Drs. A. B. Robbins, Samuel Welchens, George W. Neidich, John McCalla, J. G. Templeton, Wm. Nichols Amer, J. Z. Hoffer, E. M. Pierce, G. B. McDonneld, M. H. Webb and Prof. G. T. Barker.

A majority of the Board of Censors being absent, Dr. John McCalla was elected to act as Censor, *pro tem.*

The Board of Censors report having examined the Constitution and By-Laws of the Pittsburg Dental Association, and find them in harmony with the Constitution of the State Dental Society; they recommend that Articles III and XIV be so amended as to admit none to membership except dentists in regular practice, and of good standing. They also report the credentials of the following delegates from their respective societies as being satisfactory, viz:

From the Lake Erie Dental Association.—Drs. C. D. Elliott, C. B. Ansart, C. H. Bagley, George J. Luce.

From the Pittsburg Dental Association.—Drs. M. E. Gillespie, James King, H. W. Arthur and J. D. White.

From the Harris Dental Association.—Drs. D. R. Hertz, J. S. Smith and A. F. Herr.

From the Pennsylvania College of Dental Surgery.—Prof. George T. Barker.

Report accepted, and the above delegates, on signing the Constitution, were declared members.

An address of welcome was delivered to the members of the State Dental Society, by Dr. James S. King, on behalf of the Dentists of Pittsburg and vicinity, which was replied to by Dr. Samuel Welchens, for the State Dental Society.

The Board of Censors further report the credentials of Dr. James Orr, from the Pittsburg Dental Association, as entitling him to membership.

The Executive Committee recommend that the sessions of the Society, during this meeting, shall be from 9 to 12 A. M., and from 2½ to 5½ P. M.; that a public address be delivered on Wednesday evening, at 8 o'clock; that Thursday morning be devoted to clinics, operative and mechanical, together with the presentation of cases, instruments and appliances. Report accepted, and recommendation adopted.

The Publication Committee report having examined and published all essays and papers that were placed in their hands.

The delegate to the New York State Dental Society, Dr. A. B. Robbins, reports having been unable to attend that body. Dr. J. G. Templeton, delegate to the Ohio State Dental Society, also reports non-attendance, on account of absence from home. Dr. George B. McDonneld, delegate to the American Dental Association, reports having attended the meetings of that body, and that the interchange of opinions and sentiments have been very agreeable and instructive.

Adjourned until 2½ o'clock.

AFTERNOON SESSION.

The special committee appointed for the revision and presentation of

the bill to the Legislature, report that they had prepared a bill, such as they judged would be acceptable to the profession, and would accomplish the desired end, or at least be a basis upon which further legislation might be secured. They advanced a step over last year, by having it reported from the Executive Committee to the House, but failed in securing its passage; yet at the same time feel encouraged to continue the effort. The committee recommend that an appropriation be made to continue the application. Report accepted, and committee discharged.

On motion, a new committee, to consist of Drs. Robbins, McCalla, Moffitt and Martin, was appointed, to continue the application of this Society for legislative enactments to improve the profession, with power to draw upon the Treasurer for funds necessary to prosecute the work.

The amendments to the Constitution, proposed at the last annual meeting by Dr. Robbins, were next considered, and, on motion, the first amendment was adopted, viz: "That Article XI be amended by substituting 'the members present,' for 'a full quorum.'"

The second amendment, viz: "That the Constitution of the State Dental Society of Pennsylvania be amended by adding the following article: 'Any member of the State Dental Society, in good standing, may, upon passing a satisfactory examination by the Censors, with the approval of the Society, receive a certificate, constituting him a Fellow of the State Dental Society of Pennsylvania, under seal, signed by the Censors, President and Secretary,'" was ordered to lay over until our next meeting for reconsideration.

The committee appointed to procure a seal for the Society being absent, and unable to report, was discharged, and a committee of three, viz: Drs. Welchens, Robbins and McCalla, appointed to procure such seal before the next annual meeting.

By a vote of the Society, the order of business was suspended, and the election of officers postponed until Thursday afternoon.

The place for holding our next annual meeting being in order, Lancaster and Gettysburg were proposed, and, by a vote of the Society, Gettysburg was chosen.

Letters were read by the Secretary from Drs. W. A. Breen and M. Lukens Long, asking to withdraw from the Society. On motion, their requests were granted.

The Board of Censors report favorably on the credentials of Drs. S. Davis and W. E. Magill, of the Lake Erie Dental Association, and, on motion, they were declared members.

The Treasurer was ordered to pay all bills incurred for the use of this Society, properly signed and countersigned.

Prof. George T. Barker described a method of using rubber, by which

the hard rubber patent might be avoided. His plan was, by using soft rubber, or the ordinary rubber, partly vulcanized, for the plate; the teeth being secured by arches of tin fastened to the pins, and extending around the inside of the teeth. He stated certain improvements, which would have to be made before it would be practicable.

The experience of the members was called for in reference to whalebone rubber, and those who have tried it consider it an improvement on the ordinary rubber.

WEDNESDAY MORNING.

The minutes of yesterday read, corrected and approved.

The Recording Secretary was directed to read the Constitution and By-Laws for the benefit of new members.

On motion, the clergy, physicians and dentists of the city were invited to attend all the sessions of this body.

An essay was read before the Society by Dr. John McCalla, of Lancaster, on "Extracting Teeth,"* describing the instruments and modes of performing the operation, of both ancient and modern times; the improvements made on instruments from time to time, and giving a description of the most approved instruments of the present day.

The subject of the essay was opened for discussion by Dr. Magill, who considers simplicity in instruments desirable; uses as few instruments as possible; advocates a low chair, and desired to do his work quickly; position was everything; wants to be master of the situation; does not recommend lancing of gums, except for going through the process, and in that case makes a vertical incision only.

Prof. Barker said the operator should study the law of forces; did not think strength so necessary as a correct application of the force; thought the proper use of the upward or downward force one of the elements of success; the alveolus should be crowded out of the way; advocated but one instrument when practicable, particularly when administering anæsthetics.

Dr. Gillespie said, while general rules might be given for the performance of the operation, yet there are cases which must be decided upon at the time by our good judgment; thought lancing not generally necessary, except at the posterior side of the wisdom teeth; advocated Physick's forceps for the dens sapientia.

Dr. Robbins suggested that, in connection with this subject, we should discuss the subject of when to extract.

Dr. Magill related a case of what he supposed to be neuralgia, but found, after extraction, to be ossification of the pulp; he inquired of the

* Published on page 1.

Association if there were any reliable symptoms accompanying exostosis and ossification of the pulp.

Prof. Barker said pain from exostosis is never permanently relieved by topical applications, sometimes temporarily by cold water; wished the Society to pass a resolution that no tooth should ever be extracted which might be made serviceable to the patient; that the wishes or present feelings of the patient should not be considered; wished this Society would stigmatize the wholesale destruction of the natural teeth. Prof. Barker offered the following resolution:

Resolved, That it is the judgment of this Society, that no teeth should ever be extracted which, by proper treatment, may be made serviceable to the patient.

On motion, adopted by the Society.

Dr. J. G. Templeton read an essay on "Mechanical Dentistry,"* describing the different methods, and advantages of each method of making artificial teeth.

Adjourned until 2½ o'clock.

AFTERNOON SESSION.

The subject of Dr. Templeton's essay being open for discussion, Prof. Barker described the different varieties of palatine defects, and his method of taking impressions for the purpose of constructing appliances to remedy these defects; uses a piece of sponge, size of the aperture, fastens a wire for the purpose of holding it, saturates the sponge with batter of plaster, and secures the impression in one piece.

Dr. Luce described a method of using aluminum as a base, securing the teeth to the plate by means of rubber; punches holes underneath the blocks, and countersinks well on the under side; sometimes covers the whole surface of the plate with rubber.

Prof. Barker exhibited an aluminium plate soldered, and described the process of making the same, as follows: strike up the plate, arrange the teeth, and wax up the same as for rubber; insert in flask, separate, remove the plate, and scrape carefully where the solder is to be applied; melt solder on the plate without flux, by holding over an alcohol lamp with pliers, same as tinning iron; plate replaced in lower flask; upper flask containing teeth carefully heated; solder melted and poured around pins, gates having been cut for excess to escape; flask closed and allowed to cool.

Dr. Barker said the process described by Dr. Luce was similar to that of Dr. T. Yardley Brown, of Reading, with the exception that Dr. Brown used a fusible metal instead of rubber. Either process he thought ob-

* Published on page 15.

jectionable, on account of the secretions getting between the plate and rubber, or plate and fusible metal.

The Secretary read a letter from Dr. B. T. Whitney, President of the New York State Dental Society, asking for the assistance of this body, in their efforts to elevate the profession by establishing a degree. Ordered to be placed on file, and to be answered by the Corresponding Secretary. A letter was also read from Prof. J. H. McQuillen, regretting his inability to be present.

Dr. Geo. B. McDonneld read an essay on "The Treatment of Exposed Pulps." Dr. Robbins opened the discussion by asking for some definite information as to the best material to be used for capping nerves, or whether, and under what circumstances the operation was advisable; whether any benefit could be derived from constitutional remedies. Dr. Gillespie was eclectic in his practice; sometimes succeeds with one material, sometimes with another, but was willing to be content if he succeeds in the large portion of cases; uses carbolic acid as a preliminary application; prefers oxychloride of zinc for filling; the pain from its application usually subsides in a short time. Dr. Robbins thinks the pain may be obviated by using a weaker solution of the chloride. Dr. Barker believes in using carbolic acid and a strong solution of the chloride. Dr. James S. King has had considerable success in the treatment of exposed pulps, thinks a great deal depends upon the proper manipulation of the paste; does not use carbolic acid; prefers pure creosote; thinks 95 per cent. of exposed pulps can be saved; does not always fill immediately; sometimes treats for some time with creosote; thinks in the worst cases there is a chance of success, and considers it our duty to use the chance: thinks gutta percha not so good as oxychloride. Dr. Barker thinks it impossible to obtain *pure* creosote. Dr. Neidich thinks success almost certain in good subjects, and recent exposure; thinks pressure, or the forcing of foreign substances through the aperture is the cause of most failures; considers gutta percha quite as good as oxychloride of zinc, perhaps a little more difficult to apply without pressure, but not so much pain in the application; does not think there is any difference in the action of creosote and carbolic acid; believes the pulps have sufficient recuperative powers to close the opening if protected from thermal changes and external irritants; has seen such cases closed by secondary dentine, or calcification of the pulp, without the aid of art; does not believe a diseased pulp can ever be restored to health; in such cases always extirpates.

A public address was delivered on Wednesday by Dr. Sam'l Welchens, on "Association as an Element of Improvement."*

* Published on page 24.

THURSDAY MORNING.

Minutes of yesterday read, corrected and adopted.

This morning being set apart for clinical operations, and the presentation of cases, instruments, mechanical appliances, &c., Professor Barker described a case upon which he proposed operating, viz: The filling of a compound cavity in a right superior second molar, anterior and grinding surfaces, extending somewhat beneath the gum; pulp covered by secondary dentine. Dr. Barker operates under difficulties, not being accustomed to the chair, instruments, foil, &c. The foil was manufactured by Mr. Dunlevy, gold beater, and kindly furnished to the Society free of charge. Dr. Barker commenced his operation on three retaining points at the cervical wall, this part being protected by wedges; used No. 8 gold foil for the anchorage and floor of cavity, then successively Nos. 20, 60 and 120; used a tin mallet, weighing 1¼ ounces.

A case of necrosis of the inferior maxillary bone was presented to the Society. A gentleman, æt. 55, strumous diathesis, greatly emaciated from the excessive discharge of pus, great anxiety of countenance. Patient had been operated upon several times, but the operation failed for want of the complete removal of the dead bone. The treatment recommended by Prof. Barker, whose judgment was asked by the Society, was good, nourishing food, cheerful company to relieve the mental anxiety, tonics, plenty of fresh air, and the complete removal of sequestrum, preserving, if possible, a border of the maxilla and the periosteum.

A case of a young lady afflicted with an osseous or cartilaginous tumor of the inferior maxilla was also presented. Patient of good health, æt. 17, sanguino-bilious temperament; tumor caused by the unskillful extraction of a molar tooth, evidently accompanied by an abscess from a remaining root; gum of a purple aspect, fistulous opening. The treatment proposed was the removal of the root, and the application of a strong ethereal solution of iodine to the maxilla, both externally and internally.

Dr. S. S. White, of Phila., through his agent, Mr. S. T. Jones, exhibited a very fine assortment of instruments, teeth, &c., presenting the latest ideas of some of the leading operators of the profession. At the request of the Society, Dr. A. B. Robbins explained the advantages of the designs of different originators.

The Treasurer reports a balance of $37.26 remaining in his hands, after paying all orders drawn upon him. Examined by the Executive Committee, and found correct. Accepted by the society.

AFTERNOON SESSION.

The special order of business being the election of officers to serve for the ensuing year, the society elected by ballot the following officers, viz:

President.—Dr. JOHN McCALLA, Lancaster, Pa.

1st Vice President.—Dr. J. G. Templeton, Newcastle, Pa.

2d Vice President.—Dr. M. E. Gillespie, Pittsburg, Pa.

Recording Secretary.—Dr. C. H. Bagley, Meadville, Pa.

Assistant Recording Secretary.—Dr. C. B. Ansart, Oil City, Pa.

Corresponding Secretary.—Dr. Samuel Welchens, Lancaster, Pa.

Treasurer.—Prof. G. T. Barker, Phila., Pa.

Board of Censors.—Dr. A. B. Robbins, Meadville, Pa.; Dr. W. E. Magill, Erie, Pa.; Dr. J. D. White, Pittsburg, Pa.; Dr. Geo. W. Neidich, Carlisle, Pa.; Dr. Geo. J. Luce, Titusville, Pa.

The President appointed, with the approval of the society, the following committees, viz:

Executive Committee.—Drs. A. B. Robbins, Geo. W. Neidich, William Nichols Amer, J. Z. Hoffer, G. T. Barker.

Publication Committee.—Profs. G. T. Barker, J. H. McQuillen, T. L. Buckingham, Drs. J. S. King, C. H. Bagley, Samuel Welchens, W. N. Amer.

The President and Secretary were authorized to issue credentials to any six members who wish to attend as delegates to the American Dental Association. Dr. W. E. Magill was appointed a delegate to the New York State Dental Society, and Dr. J. S. Smith a delegate to the Ohio State Dental Society.

The following members were appointed as essayists for the next meeting, viz: Prof. G. T. Barker, Drs. Samuel Welchens, Geo. W. Neidich, and George J. Luce, and were requested to announce the subjects of their essays, as soon as possible, to the Corresponding Secretary.

The following resolution was offered to the Society:

"WHEREAS, the editor of the 'DENTAL TIMES' generously offers to publish the papers and proceedings of this Society, and furnish a copy to each member free, therefore,

"*Resolved*, That a copy of our papers and proceedings be furnished the 'DENTAL TIMES' by the Publication Committee."

Dr. McCalla moved to amend the resolution, by substituting "dental journals," for "DENTAL TIMES."

Amendment lost, and resolution adopted.

Adjourned, to meet at Gettysburg on the second Tuesday in June, 1871. Session to continue three days.

THE ASSOCIATION OF THE ALUMNI OF THE PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

A preliminary meeting of a number of the graduates of this College was held on Thursday evening, March 24th, 1870, for the purpose of forming an Association of the Alumni of the College. At that meeting a committee was appointed to draft a Constitution and By-Laws for the proposed Society, to be reported at a subsequent meeting of the graduates.

Circulars announcing that an adjourned meeting of the graduates would be held on Friday evening, April 1st, for the purpose of organizing such an association, were sent to the Alumni residing in the city, and also to all within a reasonable distance. At this adjourned meeting there was a good attendance. The Constitution and the Order of Business reported by the committee were adopted, after slight amendment, as follows:

CONSTITUTION.

Article I.—Name.

The name of this organization shall be, *The Association of the Alumni of the Pennsylvania College of Dental Surgery.*

Article II.—Objects.

The objects of this Association shall be, to promote social intercourse among the graduates, and by united effort to aid in every way the advancement of dental education.

Article III.—Membership.

Section 1. As the *Pennsylvania College of Dental Surgery* is a continuation, except in name, of the (former) institution known as the *Philadelphia College of Dental Surgery*, the members of this Association shall consist of those who have received the regular or honorary degrees in either school, and also, those who have been or may be professors in this College.

Sec. 2. Each new member, before taking an active part in the meetings, must sign the Constitution and pay the annual fee of one dollar.

Sec. 3. Any member guilty of unprofessional conduct shall, upon charges being preferred in writing by *two members*, be subjected to trial by a special committee of five members appointed for the purpose; and should the charges be sustained, he shall be reprimanded, suspended or expelled, as the Association shall determine.

Article IV.—Officers.

Sec. 1. The officers of this Association shall be a President, Vice President, Recording Secretary, Corresponding Secretary, Treasurer, and

an Executive Committee consisting of five members, three of whom shall be residents of Philadelphia, or its immediate neighborhood, the other officers of the Association being members, *ex-officio*, of the same. They shall be elected at the annual meeting, by ballot, and shall retain their positions until their successors are chosen.

Sec. 2. The *President* shall preside at all meetings of the Association, according to parliamentary usage.

Sec. 3. The *Vice President* shall assist the President, and in his absence perform all the duties devolving on that office.

Sec. 4. The *Recording Secretary* shall keep accurate minutes of the proceedings of the Association, preserve all books and papers, and attend to all duties that pertain to his office. He shall give due and timely notice of all meetings to the Alumni, and for this purpose shall keep a separate book, with the names and residences of graduates, whether members in good standing or otherwise. The incumbent of this office shall be a resident of Philadelphia.

Sec. 5. The *Corresponding Secretary* shall attend to the correspondence of the Association with other organizations.

Sec. 6. The *Treasurer* shall receive all moneys paid into the Association, and keep an accurate account with each member. He shall notify all members in arrears for dues, and shall report the same at each annual meeting. He shall pay no money except on drafts properly countersigned by the President and Secretary, and only upon a vote of the Association. He shall make a report in full to the Association at the close of his term of office.

Sec. 7. The *Executive Committee* shall be the business committee of the Association. To it all business occurring in the intervals of meetings shall be referred. It shall make all necessary arrangements for the annual or special meetings, and for the *Reunion* provided for in *Article V, Sec.* 3.

ARTICLE V.—MEETINGS.

Sec. 1. There shall be but one stated meeting held during the year. This shall convene in Philadelphia, in the College Building, at 10 o'clock, A. M., on the day upon which the Commencement of the Pennsylvania College of Dental Surgery occurs.

Sec. 2. The morning session shall be devoted to an address by the President, scientific essays, &c., followed by any other business that may require attention.

Sec. 3. In the evening, after the Commencement Exercises, there shall be a *reunion* of those members of the Alumni present, to be under the charge of the Executive Committee, as provided for in *Article IV, Sec.* 7.

Article VI.—Quorum.

Ten members shall constitute a quorum for the transaction of the business of the Association.

Article VII.—By-Laws.

This Association shall have power to make rules or by-laws for its regulation, and to do every other act and thing needful for the good government and support of the affairs and objects of the Association.

Article VIII.—Amendments.

This Constitution may be amended by a *two-thirds* vote, at the next meeting subsequent to that at which the written proposition for the alteration was made.

Order of Business.

1. Organization of the meeting at 10 o'clock, A. M.
2. Calling roll of qualified members.
3. Reading of the minutes.
4. Address by the President.
5. Reports of Standing Committees.
6. Reports of Special Committees.
7. Election of Officers.
8. Unfinished business.
9. New business.
10. Installation of Officers.
11. Adjournment.

The meeting then proceeded to the election of officers, when the following gentlemen were chosen to serve until the annual meeting:

President.—Prof. James Truman.

Vice President.—C. N. Pierce.

Recording Secretary.—E. R. Pettit.

Corresponding Secretary—Wm. H. Trueman.

Treasurer.—E. H. Neall.

Executive Committee.—T. L. Buckingham, E. T. Darby, Robert Huey, Philadelphia; J. G. Templeton, New Castle, Pa.; Wm. Smedley, West Chester, Pa.

Letters have been received from some who were unable to be present, expressing their approval of the Association, and their desire to co-operate with those taking a more active part in its organization. The officers of the Association are determined that nothing shall be left undone to insure a pleasant and profitable reunion on the evening of the next Annual Commencement of the College.

It will be observed that Article III of the Constitution provides that the membership of this Association shall also include the graduates of the (former) Philadelphia College of Dental Surgery. The reason for this will be understood by the more recent graduates of the present institution, when they learn that the Board of Trustees of the Pennsylvania College of Dental Surgery appointed the same Professors to the various chairs that had taught in the old College; and as this Faculty had procured the rooms, and furnished all the appliances for teaching in the first College, this second one was but a continuation of the first, working under a different name.

Particular attention is called to that portion of Article IV, Sec. 4, which requires the Secretary to keep a record of the names and residences of the Alumni of both institutions, whether members of the Association or not. As changes of residence are frequently made, it will be impossible for him to do this without the co-operation of the graduates. The undersigned, therefore, particularly requests that *all* the graduates will send him their names and address without delay, whether they desire to become members of the Association or not. Those who desire to join the Association may remit the annual fee (one dollar) at the same time.

E. R. Pettit,
No. 1104 *Arch St., Philadelphia, Pa.*

The Tenth Annual Session of the American Dental Association will be held in Nashville, Tenn., commencing at 10 o'clock on Tuesday, the 2d day of August next.

The Executive Committee and Treasurer will be in readiness at 8 o'clock to examine credentials, receive dues, &c.

I would suggest the following amended form for certificates:

"This certifies that —— —— was duly appointed a delegate to the American Dental Association, on the — day of ——, 1870, by the Dental Society of ———, and that said —— —— is a dentist of good character and standing, and at this time in regular practice.

"The ——— Dental Society has adopted [or substantially adopted] the code of ethics of the American Dental Association.

—— ——, *Secretary.* —— ——, *President.*"

"Each local society may send one for every five of its active members, and each Dental College one from its faculty, as delegates to this Association for one year, upon complying with the requirements of its constitution; but no society shall be entitled to representation that does not adopt or substantially recognize its code of ethics."—*Constitution A.D.A.*

M. S. Dean, *Recording Secretary.*

Editorial.

THE STATE DENTAL SOCIETY OF PENNSYLVANIA.

This Society held its annual meeting in the city of Pittsburg, on the third Tuesday of June, (21st inst.,) and continued in session three days. It was our privilege to be present, and we have never, in any dental gathering, met a body of men so earnest and industrious. The attendance of delegates from local societies was quite large, there being also a number of practitioners present, who, though not delegates or permanent members, hence unable to take part in the proceedings, yet evinced great interest in the meetings, many being in constant attendance.

It was plainly to be seen that the members came for work, and no time was lost in useless debate over parliamentary rules, or "wire pulling" of any kind, and the discussions, and papers which were presented, were alike creditable to the authors and the society.

The publication of the papers, and a lengthy report of the proceedings, compel us again to leave over for future publication several articles which we had hoped to be able to present at this time. G. T. B.

THE AMERICAN DENTAL ASSOCIATION.

We have received the following from Dr. E. A. Bogue, which we publish with pleasure, and, at the same time, express the hope that the next meeting of the Association at Nashville will be a grand reunion of members of the profession from all sections of the country, alike actuated by desires for professional advancement and scientific development. We believe the meeting, from all we hear, will be largely attended. G. T. B.

New York, June, 1870.

The Erie Railroad Company has agreed to sell tickets to those wishing to attend the American Dental Association, at Nashville, for half fare, that is, $34 for a ticket from New York to Nashville and return, good for thirty days. All living in New England or near New York, at any point, can obtain tickets at this rate by sending money orders for this amount named to J. F. Phelps, ticket agent of the Erie Railroad, No. 957 Broadway, New York City.

E. A. Bogue, *Chairman of Committee.*

THE PHYSIOLOGICAL ACTION OF PROTOXIDE OF NITROGEN.

BY JOHN J. COLTON, M. D., PHILA., PA.

It has been a disputed point among scientific men, ever since the protoxide of nitrogen came into general use as an anæsthetic, whether its action depends upon oxidation, or whether the carbonic acid generated either by the ordinary disintegration of tissue or by super-oxidation, produces the anæsthesia. Eminent gentlemen in this country and Europe have maintained (and with some plausibility) that carbonic acid, by its action upon the nerve centres, produces the anæsthesia, arriving at this conclusion from the fact that evidences of asphyxia are, in some cases, so manifest, while others have held to the theory of oxidation.

Having administered this gas to many thousands of persons, having inhaled it in my own person hundreds of times during as many successive days, and having carefully watched its effects upon the system under the greatest variety of circumstances and conditions, I have maintained that its action must depend upon oxidation, and that the indications of asphyxia, (slight in ordinary cases,) are merely an incidental effect rather than the main cause of the anæsthesia.

The following experiments, it seems to me, clearly establish this theory:

Exp. 1. Take two jars, of equal size, filled with lime water; pass a definite amount of air as it comes from the lungs through one solution, and it is rendered turbid; pass an equal amount of nitrous oxide as it escapes from the lungs through the other solution, and it is also rendered turbid, but to a greater degree than the first, indicating the presence of carbonic acid in greater quantity.

Exp. 2. Breathe through a tube into a solution of litmus blue, and it is changed to red. It will take, we will say fifteen seconds, to effect the change, (the time depending upon the strength and quantity of the solution.) Now breathe nitrous oxide gas through another solution of the same strength and quantity, and we shall notice the change of color in from ten to twelve seconds, indicating the elimination of carbonic acid to a greater extent than the normal amount, while breathing the gas, as in the first experiment.

Exp. 3. Take a full inspiration of air, retain it in the lungs for one minute, and there are no indications of anæsthesia. Now try the same experiment with the gas, and the anæsthetic effect is manifest almost to insensibility, while there are no indications of asphyxia.

We have thus demonstrated by the first two experiments, that while breathing protoxide of nitrogen, an increased amount of carbonic acid is exhaled, and as this excess *must* be produced by oxidation, we *reasonably* infer that the action of the protoxide is oxidation; and the third experiment furnishes corroborative testimony, though of a negative character, for if the retention of carbonic acid causes the anæsthesia, why are there not some indications when air is retained in the lungs?

If we inhale pure nitrogen, we still exhale carbonic acid for a time, owing to the union of the oxygen previously introduced into the system with the carbon and hydrogen of the tissues, but the amount is sensibly diminished. Now, this diminished amount of carbonic acid might have been anticipated, since we have not furnished sufficient oxygen to produce the normal amount. But on the other hand, when we find an increased amount of carbonic acid, we infer a corresponding increase of oxidation.

But it is objected that nitrous oxide is not a mixture of gases like the air, but a chemical compound, and therefore, it does not act by oxidation. Let us see.

Exp. 4. Plunge a lighted taper into the gas, and it burns with greatly increased brilliancy; the heated elements of the taper presenting a stronger affinity for the oxygen than the nitrogen does, take it and form the new combinations, carbonic acid and water. This fact shows the affinity of the elements composing nitrous oxide to be feeble.

Reasoning, now, from analogy, we might be led to infer that similar results would follow the introduction of the gas into the system, and such we find to be the case. The oxygen of the gas, by its stronger affinity, seizes upon the carbon and hydrogen of the tissues, with the same results of combination as in the case of the taper; in other words, we have super-oxidation.

But it is objected that *pure oxygen* exerts a less powerful action upon the system than the gas, which is two-thirds nitrogen. The answer is simply that the blood absorbs but a small percentage of oxygen, so that when it is introduced into the lungs it finds its way into the system slowly, while nitrous oxide is rapidly absorbed and conveyed to the tissues, to be given up for combination.

Exp. 5. If one takes a full inhalation of the gas, he instantly feels a thrill throughout the entire system. This is the incipient stage of anæsthesia, and the rapidity of its action is another proof of the theory of oxidation; for if these sensations were caused by the accumulation of carbonic acid, we should hardly anticipate such a result in the course of a few seconds.

It is still further objected, that the asphyxiated appearance of persons under its influence, indicating a superabundance of carbonic acid in the system, suggests, at least, that it is the cause of the anæsthesia. The third, fourth and fifth experiments furnish proof of the absurdity of this conclusion.

Moreover, the principal evidence of asphyxia, ordinarily manifested, is the cyanosed tint of the lips, which is, in part, produced by pressure in holding them tightly upon the inhaling tube, while in certain cases, in which these evidences are more striking, there is a cessation of breathing, caused by the tongue falling back upon the epiglottis; by removing this obstruction, and allowing the patient a breath of air, the symptoms of asphyxia disappear. If the inhalations be prolonged to extreme limits, we shall also notice the asphyxiated appearance, owing to the accumulation of carbonic acid.

The above indications furnish the main argument in favor of the carbonic acid theory. That there accumulates in the system a larger than the normal amount of carbonic acid is evident, and this is entirely consistent with the theory of oxidation; but this accumulation is not in sufficient amount in ordinary cases to attract attention, certainly not enough to produce profound insensibility. Moreover, the effects of nitrous oxide upon the system are not such as we should anticipate were they caused by the action of carbonic acid, for it is depressing in its influence. Even if a slight impediment is offered to its elimination from the lungs, "a feeling of discomfort and depression, increasing with the duration of the interruption, is speedily felt."

Now, while inhaling the nitrous oxide, although there is an increase of carbonic acid in the system, yet, if it be in sufficient amount to produce anæsthesia, how shall we explain the immediate reaction, and the agreeable sensations while inhaling, as well as for some time subsequent.

In the ordinary use of stimulants there follows "a period of depression corresponding to the exaltation of the functions excited," yet persons who have submitted to the influence of nitrous oxide, give no indications of this character. On the contrary, there ordinarily follows a period of exhilaration, just what might be anticipated from an excess of oxygen. The system resumes its normal condition as soon as the oxygen has been disposed of by union, and the carbonic acid and other products of oxidation eliminated, which process is very rapid—while chloroform, ether, alcohol, and other narcotics and stimulants linger in the system much longer, and, by their prolonged action upon the nerve-centres, produce their depressing effects and obstruct oxidation.

But the wonderful power of the nitrous oxide yet remains to be explained. It is a well known principle of chemistry, that elements in the nascent state, just liberated from union, exhibit remarkable characteristics and properties. Nitrogen and hydrogen, for example, placed in a jar together, manifest no affinity for each other, and cannot be induced to unite, even by the application of the most intense heat; but let them come together just at the moment of liberation from other compounds, and they combine with the utmost avidity. This is the precise condition in which the oxygen of the protoxide is found, as it enters into combination with the tissues of the body—just liberated from its union with nitrogen, it is in its nascent state—the active condition, and thus it exhibits its extraordinary powers of oxidation.

I have in this brief and cursory manner endeavored to prove, (1) that persons breathing protoxide of nitrogen exhale a larger amount of carbonic than while breathing common air; and (2) that its action is essentially oxidation, and that the excess of carbonic acid in the system is merely incidental, and in no wise sufficient to produce anæsthesia; and (3) that its inoffensive effects are due to its action as an oxydizer; and (4) that no subsequent depression follows, but rather a rapid reaction; because, acting by oxidation, the products of its combinations are speedily eliminated from the system; and (5) that its remarkably powerful action is due to its entering into new combinations just at the moment of its liberation, when in its nascent state.

I shall reserve for a future article what I had intended to say of its uses and abuses, and close by expressing my profound conviction that the pure protoxide of nitrogen, administered within proper limits, is harmless in its action, while if made from contaminated materials, if generated at too high a temperature, if used immediately after it is made, if the impurities ordinarily found in it be not removed, if inhaled in sufficient quantity to produce profound anæsthesia, after being prepared for a few days, or if the administration of the *pure gas* be persisted in beyond *certain limits*, it is capable of an immense amount of mischief. At the same time, I would express the earnest desire that a free and full discussion of the subject may afford a better knowledge of its physiological action, and increase its value as an agent for the relief of human suffering.—*Med. and Sur. Reporter.*

FACULTY.

T. L. BUCKINGHAM, D. D. S.,
PROFESSOR OF CHEMISTRY.

E. WILDMAN, M. D., D. D. S.,
PROFESSOR OF MECHANICAL DENTISTRY AND METALLURGY.

G. T. BARKER, D. D. S.,
PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS.

JAMES TRUMAN, D. D. S.,
PROFESSOR OF DENTAL HISTOLOGY AND OPERATIVE DENTISTRY.

JAMES TYSON, M. D.,
PROFESSOR OF PHYSIOLOGY AND MICROSCOPIC ANATOMY.

J. EWING MEARS, M. D.,
PROFESSOR OF ANATOMY AND SURGERY.

J. M. BARSTOW, D. D. S.,
DEMONSTRATOR OF MECHANICAL DENTISTRY.

E. R. PETTIT, D. D. S.,
DEMONSTRATOR OF OPERATIVE DENTISTRY

T. L. BUCKINGHAM, DEAN,
1206 *Vine Street.*

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The Fifteenth Annual Session, 1870-'71.

PRELIMINARY LECTURES AND INSTRUCTIONS.—The Dispensary and Laboratory of the College will be opened on the 1st of September, where ample opportunities will be afforded the student, until the close of the session, for the prosecution of the practical part of the profession, under the guidance and supervision of Demonstrators of known integrity and capability; and during October Preliminary Lectures will be delivered. In this month, as well as through the entire session, a clinical lecture will be given, and operations performed by one of the Professors every Saturday afternoon.

THE REGULAR SESSION

Will commence on the first Monday in November, and continue until the first of March ensuing. The course is so arranged that about eighteen lectures will be delivered each week on the various branches taught in the College. A synopsis of which is given below:

CHEMISTRY.

The Course of Instruction from this Chair will commence with the considerations of the forces that act upon matter, and the laws which govern those forces Chemical nomenclature, the individual elements, and the compounds resulting from their combination, will then be considered. The course will be illustrated by diagrams and such experiments as can be performed before the class.

MECHANICAL DENTISTRY AND METALLURGY.

The instructions from this chair will embrace—the proper fitting up of a dental laboratory, the use of tools, refining, melting, alloying, and working of the precious metals, and the properties and combinations or alloys of the base metals used by the dentist: the description of the materials, their preparation, and the most approved formula for making porcelain teeth and blocks, together with the proper manner of compounding them; the history and properties of all substances called into requisition in making dental substitutes; the entire range of manipulation of the different materials used as a base, from the impression to the completion, and proper adjustment of the case in the mouth, and such other information as appertains to this chair. The lectures will be amply illustrated by specimens, models and diagrams, and the practical application will be given in the Laboratory, under the supervision of an accomplished Mechanical Dentist.

DENTAL PATHOLOGY AND THERAPEUTICS.

The lectures delivered from this chair will embrace General Pathology, Dental Pathology, the Pathological Relations of the Teeth to other parts of the System, together with a minute description of all special diseases that have any relation to Dental Surgery, or of interest to the Dentist. They will also include a careful examination of therapeutic agents and their general application. Their indication in the medical and surgical treatment of diseases of the mouth, both idiopathic and symptomatic, will be fully illustrated. Special attention will be directed to the application of all the Anæsthetic Agents.

DENTAL HISTOLOGY AND OPERATIVE DENTISTRY.

The lectures of this department will embrace the comparative anatomy of the teeth, the functions and microscopical pecularities of the dental organs, the development of teeth and their component tissues. It will also include a full description of the materials and instruments used in operative dentistry, and will comprise a thorough elucidation of all the operations required of the Dental Practitioner, such as filling, extracting, regulating, &c. &c. A portion of the course will be devoted to a description of the microscope and the modes of preparing specimens. The incumbent of this chair will practically demonstrate in the clinic the theories taught.

PHYSIOLOGY AND MICROSCOPIC ANATOMY.

The lectures from this chair will include a consideration of the entire subject of human physiology and physiological chemistry, with such portions of comparative physiology as are essential to a comprehensive understanding of the subject; also, the doctrines of life and organization. They will be amply illustrated by a propriate chemical experiments and vivisections.

The minute structure of the organs involved in the organic and animal functions will be carefully described and illustrated by diagrams and the class microscope.

ANATOMY AND SURGERY.

The instruction in this department will embrace a systematic course of Lectures on Descriptive and Surgical Anatomy, fully illustrated by dissections on the *cadaver*, preparations, models, drawings, &c.

The minute anatomy of the various organs and tissues of the body will be shown by the class microscope, and particular attention will be given to the demonstration of the anatomy of the head and face.

Clinical instruction in the diagnosis and treatment of the surgical diseases of the mouth will be given once a week by the incumbent of the chair. Students will thus have the opportunity of studying oral diseases, and witnessing the operations adopted in their treatment.

CLINICAL INSTRUCTIONS.

In addition to the above, with the exception of Saturday, four hours are daily spent by the student in actual practice under the supervision of the demonstrators.

IN THE OPERATIVE DEPARTMENT.—To afford every facility to the student to acquire a thorough practical knowledge of this branch, the operating rooms are furnished with twenty-eight chairs, so arranged as to command the best light, and all the appliances for comfort and use. To these chairs the students are assigned in classes, and certain hours are fixed for each member of the class to operate. Every student is required to provide his own instruments, except those for extracting. He is expected to keep them in perfect order, and will be provided with a place in which they can be locked when not in use.

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THE

DENTAL TIMES.

VOL. VIII. PHILADELPHIA, OCTOBER, 1870. No. 2.

Original.

IMPAIRMENT OF VISION THE RESULT OF DENTAL IRRITATION.

BY P. D. KEYSER, M. D.,

Surgeon to and Clinical Lecturer on Ophthalmology in the Philadelphia Eye and Ear Infirmary.

[Read before and published by request of the Medico-Chirurgical Society of Philadelphia.]

Contraction of the field and impairment of vision (amblyopia) is sometimes due to pathological irritation of the dental branches of the fifth nerve, (trigeminus,) by aching of an exposed pulp in a carious tooth, or long continued dental and facial neuralgia. Some of the earlier writers claimed that amaurosis could be caused by an abscess in the antrum as well as from carious teeth. Richter, in 1795, mentions a case of a lady who was blind for some years, recovering her sight almost immediately after having a tooth drawn that had troubled her for a length of time. Beer, in 1817, speaks of a consensual nervous affection of the eyes, that was caused by a carious upper molar, which was cured on its extraction. Deval says, that a case of a chronic relapsing inflammation of the eye was cured as by magic on the removal of a tooth.

It was, however, contradicted, and not allowed by many writers, and was not received by the profession as one of the positive causes of amblyopia and amaurosis, until Hutchinson, (London,) called the attention of the oculists to it in a very able paper, entitled "A Group of Cases Illustrating the Occasional Connexion between Neuralgia of the Dental Nerves and Amaurosis," published in the *Ophthalmic Hospital Reports*, Vol. IV, 1865. He begins by the conjecture, that many cases of loss or contraction of vision in infancy, is caused, during the period of dentition, by the reflex irritation of the dental nerves, just as we have spasms from the same cause. He gives the notes of five interesting cases of amblyopia and amaurosis, arising from neuralgia or carious teeth. In 1866, Wecker, (of Paris,) confirmed this view in a letter to Delgado, (of Spain,) in which

he mentions several cases, all of which were cured on the removal of the teeth. Alexander, (of Aix la Chapelle,) gives an account of a case of amaurosis, in consequence of dental neuralgia, in the *Klin. Monatsblt. für Augenheilkunde*, February, 1868, where the patient could only make out types Jaeger XV with the right eye, and Jaeger VI the left. The examination of the fundus of the eye with the ophthalmoscope gave a negative result, and after three days treatment without result, he discovered that the first right upper molar was carious and aching, and concluded that the loss of vision was from it, and ordered it removed; two days after which the sight was again normal.

Schmidt, (of Berlin,) has an exhaustive article "Upon the Reduction of the Power of Accommodation by Tooth-ache," in the *Archiv. für Ophthalmologie*, Vol. XIV, Part I. He examined the sight of ninety-two cases, who were attending the dental clinic of Dr. Albrecht, for carious teeth, &c., and found that only nineteen had perfectly normal sight, while seventy-three of the cases suffered from some loss of vision; in some of whom the reduction of accommodation was very great.

Other affections of the eyes, besides amblyopia and amaurosis, arise from carious teeth. F. M. Mackenzie gives a case of circumscribed sclerotitis, accompanied by aching in the second molar tooth of the same side, which was only cured on the extraction of the tooth, after all other treatment had been tried without effect.—*Oph. Hosp. Reports*, Nov., 1869.

It has now become an accepted fact, that affections of the eye, particularly that of amblyopia, can be the result of reflex irritation from dental nerves, as from neuralgia, &c. And in all the recent works of ophthalmology, mention is made thereof, although it is touched so lightly as to look as if yet somewhat doubtful. Stellwag, page 673, says "that amaurosis sometimes results from traumatic periostitis of the orbit, from ozena, from abscesses of the antrum, with subsequent caries of the orbit, as is often caused by diseased teeth." Wells (*Treatise on the Eye*, page 413,) writes, "amblyopia is sometimes due to reflex irritation originating in one of the branches of the fifth nerve, or in other parts of the nervous system. Thus, severe and prolonged dental neuralgia may produce impairment of vision, which mostly disappears with the removal of the carious teeth." Wecker (*Traité Pratique des Maladies des Yeux* 1868, Tome II, page 437,) speaks more fully on this point, mentioning the researches of Hutchinson, Schmidt and himself, establishing, without doubt, that amblyopia and amaurosis can take place from the irritation of the fifth pair by tooth-ache and dental neuralgia.

In illustration of this idea, I present the following cases that have come under my treatment the past few years:—

May, 1866.—Frederick S——, æt. 18, came to me with the report that

his sight had failed in the past two days so that he could not see to read. There was no inflammation of the conjuctiva or ball. Ophthalmoscopic examination gave a negative result, and no special cause could be found for the defect. Upon questioning him as to general health, he said nothing ailed him but severe tooth ache at times. On examination, I found second molar on the right side, and first and second on the left carious, exposing the pulps. At my recommendation they were extracted, and the sight returned to the normal standard the next day.

May 4, 1866.—Frederick W. K——, æt. 37, complained that he had been suffering with dental neuralgia for a week past, and that his sight had become quite dim; could only make out large letters; could not distinguish any person at twenty feet, when, before the attack of neuralgia, his sight was perfect. Nothing abnormal was to be seen in the eyes, or by the ophthalmoscope. His teeth were all sound and in good order. After treatment for neuralgia, which was cured in a few days, his sight returned to its normal standard.

February, 1867.—Mary H——, æt. 18, sight had gradually failed the past week so that she was unable to sew or read. The patient was a fine healthy looking girl; said she had never been sick in her life. Catamenia regular; had all the points of perfect health. With the right eye could with difficulty see Snellen's test types XX, at 10″. Left eye could make out the same at 6″ only. Examination with the ophthalmoscope gave no clue to the cause, as the fundus was normal. After a few days treatment, without any improvement, I examined her teeth, and found the second bicuspid and first molar of the left side much decayed, and, on inquiry, she said that she had been almost crazy with the tooth-ache off and on for the past four weeks. On the extraction of the teeth, she returned to me three days after with the report that she could sew again.

October, 1868.—George W——, æt. 30, came with the complaint, that six months previous his sight became suddenly dim, and had remained so ever since. Jaeger's test types, No. 17, could be read at 7″. Ophthalmoscopic examination gave a negative result. Had not used tobacco or liquor to any great extent—rather moderately. Had always been in good health. After a week's treatment in the generally prescribed methods, without any improvement, I examined his teeth and found caries, of some three or four, with exposed pulps, from which he had suffered for a long time with tooth-ache. Not desiring to lose the teeth, I recommended him to have the nerves destroyed and removed, and then plugged with foil, with the hope of receiving the same benefit as in the former cases when the teeth were extracted. The result was satisfactory; the sight returned again to its normal state after his teeth were fixed, and he returned home to the country.

December, 1868.—J. C. H——, æt. 22, suffering from amblyopia. His vision had become impaired in the left eye the past few days so that he was not able to read with it. Sight in the right eye normal. Left eye, half normal. Ophthalmoscope showed nothing positive. He said that he had been suffering from dental neuralgia for a month, with great soreness of the gums on the left side. Upon examining his teeth, one of the bicuspids, which had been plugged sometime ago, was very tender and felt elongated. Surmising inflammation at the root, with exostosis, was the cause of all his trouble—amblyopia as well as neuralgia—I advised him to have it extracted, which was done the same day, and with the happy result of relieving his neuralgia and return of perfect vision almost at once.

December, 1869.—Mrs. M. F——, æt. 61, came to my clinic complaining of loss of vision in both eyes and floating motes in the right eye the past few days. Could not see to sew or read even with her glasses. Supposed it to be dyspepsia from improperly masticated food, as she was obliged to remove her false teeth from great pain and soreness in two teeth, one on either side, to which they had been fastened for years by clasps. She reports that she had been suffering with considerable tooth-ache for some time, more particularly when she put her artificial teeth in. Ophthalmoscopic examination gave a perfect negative result, with the exception of a couple of small floating particles in the vitreous of the right eye. After nearly a month's treatment for dyspepsia, &c., without beneficial result, I examined the teeth, and found that the clasps had worn into the teeth on which they rested, and in one caries had attacked the part and exposed the pulp. On my recommendation she had the teeth removed, and a new upper set made; after which the sight returned with a presbyopia of one-sixteenth, and has had no trouble since.

Other affections of the eyes than amblyopia, can and do take place from reflex irritation of the branches of the fifth nerve, as in the case of Mackenzie, quoted above, of a sclerotitis, which could only be cured on the removal of a decayed molar tooth. It is a well-known fact that inflammation of the cornea, and sometimes ulcers of the cornea, take place as the result of disturbance of the conduction of the trigeminous nerve. If there is paralysis of the nerve only, the affection of the cornea is only an infiltration which often recedes. But in complete paralysis, ulceration and destruction take place. Therefore, as severe irritation of the dental nerves, by reflex action, can limit or prevent the proper and full conduction in the fifth nerve, causing neuro-paralysis, affections of the cornea may be the result. Whether the immediate cause of the affection of the cornea be from the neuro-paralysis, or as some writers (Snellen and Winther,) claim, from the various external injuries to which it is exposed,

on account of the insensibility of the organ, the primary cause is from another point, and can be from reflex action of the dental nerves as well as other branches of the fifth nerve.

The following case illustrates the above views:—

June, 1868.—Albert H——, æt. 33, came to me for treatment of inflammation of the cornea of the left eye, with the history, that about ten days or two weeks before, the eye became inflamed without any apparent cause. He had tried the ordinary house remedies without benefit, and on consulting a physician, was recommended to put himself under my treatment. Upon examining the eye, there was infiltration of nearly the whole cornea, with a small spot as beginning ulceration in the centre. There was little if any pain; anæsthesia of the cornea was present, as the touch of a feather or roll of paper was not felt. The patient was of a good, healthy organization, and reported that he had never been sick.

The regularly prescribed treatment for inflammation of the cornea, and attempt to remove the neuro-paralysis was continued for two weeks, without the least change in the cornea for better or worse, the inflammatory process being seemingly at a stand still. Hoping that the continued treatment might induce an improvement, it was tried a week longer, but to no effect. On the last day of the third week the patient came into my office with the left side of his face swollen and tied up, suffering severely from tooth-ache. He then said that he had suffered much for months, off and on, from aching teeth. Thinking that I now had a clue to the primary cause of the neuro-paralysis and inflammation of the cornea, I examined his teeth, and found the first molar of that side much decayed; a very large cavity with exposed pulp. In the cavity were some small red granulations, which easily bled on being lightly touched. At my suggestion he went and had the tooth extracted; after which the cornea began to improve rapidly, and, under the ordinary treatment, the infiltration was all absorbed and the cornea became clear again.

I will here mention a case of reflex action bearing upon this subject, from irritation of the end branches of the trigeminus, of considerable interest, which I saw, while attending Prof. von Graefe's clinic, in Berlin, in the winter of 1863–4.

A fine healthy looking girl of 19 or 20 years, came into the clinic with continual clonic spasms of the orbicularis and facial muscles of one side of the face. In searching for the cause, it was found that, by pressure upon the supra-orbital nerve, the spasm would stop. The nerve was cut through subcutaneously; but, after a day or so, the spasms returned—pressure on the same nerve having no effect. It was then found, that in passing the finger in the mouth, and pressing on the inferior dental nerves of the side

of the face affected, complete control was obtained over the spasms. Neurotomy was here performed, and the patient cured.

In examining the cases described, it will be seen that they were all young subjects, with the exception of one. Agreeing with the researches of Schmidt, as above mentioned, who examined the eyes of ninety-two persons suffering from dental neuralgia and tooth-ache, that any affections of the eye, resulting from dental irritation, occur mostly in young subjects.

Before closing this article, it is well to call attention to the fact, that there are, no doubt, cases of partial deafness occurring (one seen by myself,) as a result from the same primary cause as the above mentioned impairment of vision. The one seen by myself was cured on the removal of the tooth without any other remedy.

NOTE.—At the request of Dr. Geo. T. Barker, managing Editor of the *Dental Times*, the article is published in this Journal, it being considered of special interest to the Dental as well as Medical Profession.

RICKETS, OR RACHITIS.

BY JAMES TYSON, M. D., PROF. OF PHYSIOLOGY AND MICROSCOPIC ANATOMY IN PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

There is, perhaps, no systemic disease, except syphilis, a knowledge of which is more important to dentists than rickets, since, being partially curable, it leaves behind it conditions which are constantly influencing the results of treatment in local affections, and among them those of the teeth. We propose, therefore, to present briefly such an outline of the symptoms and pathology of this affection as seems necessary to the information of members of the dental profession.

The disease usually presents itself between the first and second dentitions, indeed, very rarely before the seventh month or after the seventh year. It is generally ushered in by more or less significant prodromata, though these are by no means certain in relation to the disease which they forerun. Among them are placed defective digestion, profuse "yeasty" diarrhœa, sweating of the head, and, according to some, an unusual disposition to cover up the head with bed clothing. Again, muscular atrophy is said, and undoubtedly occasionally does, precede the more marked manifestations, though it is more commonly a result of the same cause. The first decidedly characteristic symptom is, perhaps, *tenderness* of the trunk and extremities, manifested by pain on attempting to move the limbs, by the patient or by others. As a consequence of the resulting unwillingness to be handled, follows a striking quietness, often touching in its significance, and contrasting strongly with any previous disposition to activity, or desire to be fondled. Then follows thickening of the epiphyses, and resulting deformity. Curvatures of the long

bones follow, partly from muscular contraction, but principally at a later stage, or older age, when the child attempts to stand. Fractures also result under these latter circumstances. So long as the child lies quietly upon its back, the latter accident does not occur, and the former seldom presents itself. Curvature of the lower limbs produces the conditions spoken of as "bow-leg" and "knock-knee." That muscular contraction is somewhat efficient in producing deformity, is apparent from the fact that there is curvature and even twisting of such bones as the clavicle, humerus, radius and ulna.

The "pectus carinatum seu gallinaceum," or "chicken breast," when occurring, presents itself early, and more particularly in very young children. According to Niemeyer, it results differently from the other deformities, being the consequence of diminished resistance to atmospheric pressure at the points of union between the anterior ends of the ribs and the costal cartilages during inspiration, while the firmness of the sternum enables the latter to resist and remain prominent. It is not until late in the disease that curvature of the spine and pelvic deformity occur, induced only by the superincumbent weight of the body in the sitting posture.

The flat bones of the skull become thickened, while the fontanelles remain open, frequently until the children are two or three years old. Imperfect ossific deposits also occur in the bodies of the bones of the head and face, producing characteristic deformity of these portions.

Occasionally the flat bones of the skull, and more particularly the occipital bone, become thinned as the result of persistent pressure in the recumbent posture, and it sometimes happens that there is complete loss of osseous tissue, so that the periosteum actually comes in contact with the dura mater.

The maxillary bones are involved in these changes, the teeth falling from their sockets, and occasionally also in the lower jaw, a thinning is noted similar to the cranio-tabes, as a consequence of which it is sometimes perforated by the milk teeth. Moreover, the teeth are cut late, rickety children being often a year old before a tooth presents itself; while it must also be remembered that children in no way defective not uncommonly do not have a tooth until they are a year old.

The condition of the bones of the head in no way interfere with the development of the brain, while the remainder of the body is generally dwarfed. So that there results a head disproportionately large to the rest of the body; while the constant intercourse of a child, thus invalided, with those older and more intelligent than children of its own age, causes a corresponding functional development and an intelligence often surprising to those about it. Moreover, a rachitic condition induced, the

skin is almost constantly hot, the pulse frequent and respiration quickened—in other words there is more or less constant febrile excitement in which the usual brilliancy of the eye attends. Hence we have in connection with the precocious mental development, a condition not unnaturally attributed to hypertrophy of the brain, but more satisfactorily accounted for as above.

It has been stated also that rachitic children are prone to chronic hydrocephalus. Certain it is that they are very apt to suffer with bronchial catarrh, and resulting pulmonary collapse, laryngismus stridulus, indigestion, obstinate diarrhœa with stools offensive and deficient in bile, while the constitutional condition is one entirely analogous to those which are said to develop albuminoid degeneration of the liver, spleen and kidneys. It has been well determined that the urine contains excessively from four to six times the normal amount of phosphates which occasionally aggregate to produce calculi. It also occasionally contains an excess of lactic acid.

If the children be older, say from two to three years old, the prodromata described do not occur, nor are the tenderness and pain so great, being perhaps only manifested when a fall occurs, or a misstep is taken. Moreover, instead of the thorax presenting the first manifestations of disease, the lower extremities are apt to be first affected, for the reasons stated.

The assertion of Guerin, generally received, that there is an order of selection in the development of the disease—1st, in the bones of the legs, 2d, of the thighs, 3d, of the fore-arms, 4th, of the arms, and 5th, of the trunk, is denied by Niemeyer, nor has our own experience detected any such order as constant.

Pathology.—For our knowledge of the pathological histology of this affection, we are much indebted to Virchow. Consisting primarily in a rapid proliferation of the cells of the cartilages of the epiphyses and of the periosteum of the shaft of the bone, and secondarily, in imperfect ossification of the centres thus produced, the phenomena appears to us evidently of an inflammatory nature. The increased vascularity, resulting proliferation and attendant febrile movement imply this. This is also the view of Niemeyer. Virchow believes that the retarded ossification is due to the diminished supply of chalkey salts, adducing, in support of this, the evident advantage of these salts in the treatment of rachitis. The presence of the acknowledged excess of phosphate in the urine, is better accounted for as the result of the inflammatory processes, since it is but reasonable that the consequent disturbed circulation should interfere with such deposit, and that the phosphates should consequently re-appear in the urine. Herein we have a distinctive feature of *rickets*

as distinguished from *mollities ossium* of adult life, in which we have an absorption of salts previously deposited, instead of a deficient deposit.

As to its *cause*, rickets is clearly a disease resulting from defective assimilation; however, this may be primarily induced, whether by deficient food, impure air, or other attendants of poverty, or hereditary influence. It is said to occur in the children of unhealthy parents, or of those who indulge in venereal excesses, though the disease itself is clearly not hereditary.

As to *prognosis*, rachitis is by no means always a fatal disease, for although very young children are apt to perish, those of two or three years or older many times recover, almost as often however retaining some deformity, and we fear, quite invariably remaining defective in nutritive and reparative power throughout life. Death much more commonly results from its complications, while undoubtedly the mortality of the ordinary diseases of childhood is much increased by the presence of the cachexia. If recovery is to take place, the extremities and trunk become less tender, the enlargement about the joints disappears, and the normal deposit of calcareous salts takes place. As stated, however, the deformed shapes of the bones is often retained, while they assume their proper degree of hardness, resulting in the permanent deformity alluded to, of which the more serious results are seen in the difficult labors of women.

The indications of *treatment* are clearly to correct first the intestinal conditions which are primarily attendant, and if they do not constitute the exciting causes. While doing this, we can also supply the elements from whose defect the softening and deformity result. But from the view of the pathology which we have assumed, it is clear that the processes of nutrition must be corrected before these can become available. In producing effect, cod liver oil and iron are perhaps the most efficient remedies, and combined with wholesome fresh animal food are often successful. Where there is simply deficient supply of the elements of bone, in connection with the cod liver oil, may be used preparations of the phosphates of lime, iron, soda and potassa, as the chemical food of Parrish and other pharmaceutists. The resulting muscular atrophy might be advantageously treated with frictions, salt bathing, and even the electrical current after the bones have commenced to assume a natural hardness. In the softened condition powerful muscular contractions, however induced, would contribute to produce deformity. Much may be accomplished in averting deformity by cautiously handling children who may be the subject of this affection, avoiding pressure in one position, or too long occupation of any posture either standing or sitting.

MORBID EFFECTS OF FIRST DENTITION.

BY JAMES FREDERICK BABCOCK, D. D. S.

A little child has been born into the world: many kind and affectionate friends have wished the tiny life a warm and hearty welcome, but scarcely has the little stranger become accustomed to that haven of infantile rest, its mother's breast, ere it meets and grapples with its first great sorrow, in the morbid effects of its first dentition; and truly, it may be said, that the pathway of its newly found life is obscured by a veil of tears, which have sprung into existence in the vain effort to give relief to its great agony—an agony almost greater than the little body can bear; and yet dentition is not, in itself, a morbid process, but, on the contrary, it is a healthy physiological act.

It would, indeed, be strange had the Creator of our being wilfully—as it were—designed that such suffering should be inflicted upon an innocent babe, and that the disorder of function, together with the serious and fatal consequences which sometimes follow as the direct result of the child's first dentition, should be inevitable.

The fact really is, that when performed in the normal manner, as is most eminently illustrated in the lower animals, the cutting of the teeth is effected without pain or any other evil; and many infants, when assisted by the favorable circumstances of good health and a sound constitution, do thus fortunately pass through the usually trying ordeal—both to mother and child—unscathed; but far more generally, however, the child experiences more or less suffering of a local kind, and oftentimes the pain is attended by a sympathetic irritation of a serious and it may be fatal character, and notwithstanding the greater preponderance of instances of painful dentition—which to the non-professional are naturally considered as an inevitable necessity—still they must be looked upon as thoroughly unnatural and purely morbid changes of the healthy and regular process. Accepting this as the actual fact, the question will naturally present itself to our mind—why, then, are such a large majority of the instances of first dentition either more or less painful? and why are the consequences so frequently of such a fearful character?

The truth is, that a large number of children are born into the world so feebly constituted that they are incapable of maturing; this fact is sufficiently demonstrated by the absolutely frightful percentage of mortality among children in large cities; many others, though born with a sufficiently healthy and vigorous organization, are reduced by unsuitable diet and careless defective management to a condition which readily yields to irregular or morbid agents.

A child may also appear for a time to be entirely free from any un-

healthy indications and yet be very feebly constituted, which will inevitably be shown by the development of various morbid phenomena when the vital powers come to be tested, either by accidental or physiological demands upon their energies. Now, dentition demands a certain amount of constitutional energy to accomplish it without any unfavorable symptoms, and as this demand is one of the severest tests of the organic completeness in a child, many will not bear it.

There are those who, casting aside this fact of the necessity of sound constitutional development, in order to insure the healthy, or normal process, in the eruption of the teeth, have attributed the pain and its many collateral evil effects to the simple pressure of the advancing tooth or teeth upon the nervous system of the gum structure; but those who accept this theory as the real and only explanation, cannot have considered that were such the case in reality, *all* children must inevitably suffer pain, since in the eruption of teeth—no child can be an exception—they all must necessarily press upon the gum; this we know is in nowise the case, for though all children encounter the pressure, all do not suffer the pain, but, upon the contrary, many children cut their teeth without the slightest perceptible inconvenience.

On the other hand, it would be the height of absurdity in us to deny that the pressure of the tooth, during the process of eruption, upon the nerve fibres in the gum structure could not possibly cause pain, for that would be equivalent to the statement that this highly sensitive tissue was devoid of sensation; but that the sometimes intense pain *depends* alone for its severity upon the presence of nerve fibres in this tissue, we cannot for one moment believe, for although there may be, and undoubtedly is, a vast difference in the degree of sensibility in the various gum tissues of different mouths, still, it cannot possibly be great enough to account for the differences in the various forms of dentition, ranging from that of healthy and simple to that of complicated and dangerous. Were the pain alone dependent upon the pressure exercised upon these fibres, and that comparatively simple pain *all* that the little child had to encounter, there would be little need, indeed, to record the many deaths which have occured through the development of various morbid phenomena directly dependent upon the child's first dentition; in fact, it would require an intensely vivid imagination to imagine that any serious morbid manifestation *could* occur as the result of first dentition, even in a not well developed child, simply because, and dependent upon, the pressure on these delicate fibres solely; but even were this tissue entirely devoid of the nerves of sensation, it is not denied but that it may act as an indirect agent in causing pain, for one of its principal characteristics is toughness—though to a very varied degree in various mouths—and therefore, if possessing this

characteristic in an abnormal extent, it may *resist* the passage of an advancing tooth sufficiently to produce pain in other portions of the highly sensitive organization of the jaw, by diverting the development of the tooth from its normal direction backwards, and consequently engender an abnormal pressure upon the periosteum of the root, or roots, and alveolar socket, together with the pulp of the tooth itself, thereby producing more or less suffering of a local kind; but ordinarily these effects are not serious in themselves; in fact, never are they so in a well and thoroughly developed organization, for infants so constituted are capable of enduring considerable pain; but in the constitutionally feeble child all these phenomena may present themselves, and in the eruption of several teeth at once the demand upon the system is greater than can be readily met, and the suffering will prove too great for its sensitive and sympathetic nature when constitutional disorders may be produced.

At this period of the little one's life the nervous and vascular systems are remarkably active; the several organs have to perform not only their functions, and the preservation of their entireness, but also rapid growth; animal life is exalted with all its various qualities, among which are sensibility and sympathy, or the capacity to be impressed and to propagate impression; hence, a cause, perhaps slight in itself, may produce great local or constitutional disorder, apparently much out of proportion to its own intensity or importance, and from such disorders, directly dependent upon the power to propagate impressions received from the process of the eruption of the teeth during the child's first dentition, serious and fatal consequences may follow, but never, simply *because* of the pain, which has for its basis, pressure upon the nerve fibres in the gum tissue of a constitutionally sound and healthy child.

I think that we have now demonstrated that the theory of painful dentition—represented by some as dependent upon the presence of nerve fibres in gum tissue—is incorrect; and also the fact that any form of painful dentition is an unhealthy one and may be termed a disease.

The symptoms of healthy dentition are not remarkable, and except from the self-evident proof of the occasional appearance of a newly erupted tooth, the mother is scarcely aware that her child is thus favorably passing through the usually most dreaded period of its babyhood.

An apparent increased secretion of saliva is usually noticed, though it is somewhat doubtful if there be much, or any, real increase; the mouths of infants are usually well supplied with fluids, and as they are devoid of teeth, which very materially assist in retaining these fluids in the mouth, it trickles out in large quantities thereby, giving rise to the impression that its secretion is much greater than normally.

The infant is observed to carry its fingers to its mouth very frequently,

and seems to experience much gratification if allowed to press some resisting substance between its gums; gentle friction of them also seem to afford the child much pleasure; and as nature is invariably a correct and sure guide to her own wants, it evidently is natural for the child to endeavor to allay the sensation of the gums at this period, and therefore must be perfectly proper for it to do so.

It is common to alleviate these little inconveniences by giving the child a crust of bread or something similar to press upon with its gums. One would naturally fear, however, that such continuous pressure might eventually condense and harden the tissue, thus rendering it much more impenetrable than before, and inasmuch as nature has not indicated any precise degree of hardness necessary to accomplish the desired object, it would be well to select something which does not possess this quality to an unnecessary extent.

The French use a stick of marsh mallows, or liquorice root dipped in honey, or a sweetened decoction of barley. The Germans, a small bag filled with sugar and spices; but it is very doubtful whether the success of these substances in quieting the child may not induce the mother or nurse to neglect it, and thereby deny it the breast, which it would otherwise eagerly and frequently take.

Nothing so soothes the infant as the frequent lubrication of its mouth with its mother's milk, and where there is nothing in the state of her health or the condition of her breast to forbid this indulgence, it is cruel and unnatural to withhold it.

It may be, too, that such constant use of sweet and condimental substances would disorder the stomach of the child, an accident to be studiously avoided during teething.

The bowels are generally at this time looser than usual, and although the purging may be very frequent, still, it must not be deemed excessive so long as the child nurses freely and does not emaciate. Costiveness is very much more to be dreaded during dentition than frequent passages, for it is unnatural, and unless measures be immediately taken to correct it, it may terminate in irritations, either local or sympathetic, which cannot be easily remedied.

The child may also manifest considerable restlessness, and perhaps sleep less profoundly than usual; these symptoms of a healthy dentition may, and usually do precede the eruption of the teeth for several weeks, when after a few days they will subside, to be renewed when the teeth are pressing forward and about to enter the gum.

Such are some of the symptoms of a healthy dentition, and now, in contradistinction, let us notice the diseases or morbid effects of first dentition.

When dentition becomes complicated with morbid conditions, either

directly or indirectly, the management of it requires far more care and skill; the local symptoms are to be allayed, symptomatic affections are to be relieved, and the strength of the child supported through a long and tedious process, in which the powers of its system are taxed to their utmost.

Such diseases may be termed in their division local and sympathetic; local, those which affect the gums, teeth, and mouth; sympathetic, those which manifest themselves in other organs.

First among the local symptoms we have inflammation of the gums, which are very sensitive, redder than is natural, swollen and hot; the child shrinks when you attempt to touch them, and incessantly craves the breast or cold liquids.

This state of affairs is almost always attended with more or less fever and irritation of the intestinal canal; the face is flushed, the head hot, the eyes red and watery, the flow of saliva profuse, and sometimes the salivary glands become tender and swollen; the fever is generally severe while it lasts, rising and falling with remarkable rapidity; the thirst is very great, and the sleep of the child is uneasy and frequently interrupted by starts and screams, and when awake is alternately fretful and stupid.

These symptoms are often very quickly allayed by freely incising the gum and capsule down to the teeth, and liberating them from their investments; this operation is usually of much benefit whenever the gum is elevated and distended; should it be of no relief, it would either be because it was not effectually done, or the pain to be relieved did not depend upon the mere mechanical resistance of the gum for its origin.

Many a mother considers this little operation as a most formidable one to be performed upon her child, and did we practice it as the French do, by a dissection of the gum, it would, indeed, be no trifle; there is no necessity whatever for such cruel work; a simple incision with a lancet, carrying it down until its point grates upon the advancing tooth, is all that is required; the bleeding which results is very trivial, and of much assistance in allaying the inflammation of the gum.

There are those who object to this operation, advancing as an argument, that when the wound is healed the cicatrix will present an obstacle which will act with more resistance than the original tissue.

In reply to this objection, it will only be necessary to state, that mucous membranes are the most tenacious, and yield less readily to pressure than any other tissue in the body; while the organized lymph, of which this cicatrix is formed, is very readily absorbed, consequent upon the pressure of the advancing tooth; in fact, easy absorption is one of its peculiar characteristics, wherever found.

Together with the free use of the lancet, attention should be given to the bowels of the child; if costive, their torpor should be relieved by the

proper use of purgatives, and if too loose, medicine should be given to check the diarrhœa; as the bowels of the child return to their normal condition the fever will generally abate.

The cold bath, or sponging with cold water, will be found to be of much assistance in reducing the fever and restlessness, but far and above all, pure country air and plenty of out-door exercise, will be found to be the great remedy with which to combat successfully the disorders attending dentition.

We have now mentioned some of the local effects of a morbid dentition, but were we to mention those of a sympathetic nature, which are said to be the result of teething, we should undertake the recitation of a task of great magnitude; hence, we beg leave to decline for the present, simply saying that while many of these, said to be, sympathetic diseases undoubtedly do occur during the period of dentition, still, it by no means follows that they are a necessary consequence.

Others are undoubtedly the direct result of dentition, and if recognized as such may be treated with the best results, which, if neglected or improperly treated, may terminate fatally.

STOCKTON, CAL.

ON AMALGAM.

BY DR. JAMES LEWIS.

From my earliest recollection, the Eclectic school of medicine, (as the botanists delight to be called,) have denounced mercury as an unsafe, aye, as a deleterious medicine. Homœopathy and hydropathy, also, contribute their quotas to the same denunciation; and though they have repeatedly demonstrated their hypothesis to their own satisfaction, mercury, in the form familiarly known to physicians as submuriate, (Hy.Cl.,) continues to be the *sheet-anchor* of medical practice.

From my earliest acquaintance with dentistry I have been perplexed with the discussions relating to amalgam. Perhaps I have been unfortunate in never having found any peculiar conditions of the mouth that could, by the most remote possibility, have been attributed to the influence of mercury derived from an amalgam plug. I have examined a great many teeth that have been filled with this material, and when I have found the parts around them diseased, the origin of the difficulty was so entirely referable to conditions in which mercury was not involved, that to intimate mercurial disease would be unpardonable presumption. There are, undoubtedly, instances in which, on account of a peculiar diathesis, a patient is intolerant of mercury in any of its forms, (except as administered homœopathically—in which case a mathematical "differential" may be placed as the co-efficient of the *quantity used.*) I have never, in dental

practice, seen a patient possessing this peculiar diathesis. I will admit, however, that for such a person an amalgam plug, under certain conditions, *might* be a dangerous thing. We find persons who are also intolerant of opium and its various alkaloids. We do not, on that account, *forbid* the use of opium to those persons who have no such idiosyncrasies; and when we have a patient who will bear calomel, its use, in given cases, is to be recommended, not condemned. To go back for another illustration: If we deprive ourselves of a useful agent, because the ratio of its *dangers* to its *utility* may be as 1 to 100, or even more, we might, with propriety, insist upon the abandonment of ocean steam navigation, for the reason that, occasionally, a vessel is so irrevocably lost at sea that even the "spirit mediums" fail to render an account of the fate of its passengers.

Much of the argument against amalgam and its uses is simply *specious*. Writers who delight to ventilate their ideas on this subject unconsciously pervert many of the most important facts and principles involved in our knowledge of electro-metallurgy, and their *speculations* upon the probable manner in which electric or electro-chemical forces manifest themselves in the human mouth, in connection with the substance of the teeth and of amalgam, show, to one who has patiently studied the laws of electro-chemical force, that they, (the writers,) have not yet reached even a tolerable comprehension of the subject; and when we come to consider their ideas of the pathology of the subject, we shall find, on careful scrutiny, that in some cases there is a palpable error of diagnosis, in others a disposition to condemn a substance, which, being injurious in one case, may be the *best* that is available in ninety-nine others.

I do not *advocate* the use of amalgams. I am just enough conservative not to deprive myself of a useful agent on account of a *prejudice*. At one time I was considerably influenced by the appeals of writers who sought to create a *prejudice* in the minds of the profession—(the writers themselves being evidently prejudiced)—and, for a considerable time, I argued with my patients to induce them to forego their use. It is scarcely necessary to say that this mode of doing business did not prove satisfactory, and I was *obliged* to use amalgam. Since that period I have studied amalgams with much interest, and in this connection I have also considered them as agents for the development of electro-chemical force, and their possible relations to the teeth, and to plugs of other material in the same or contiguous teeth. Probably some of my readers know the *secret* of the *white* amalgams. The best of them have the silver alloyed with *cadmium* or *zinc*. For certain electro-chemical reasons, zinc is preferable. The part that zinc plays in the compound is to protect the silver and mercury from the oxidizing influences of the fluids of the mouth. Zinc being the most highly electro-positive of any of the metals that can be used in such

preparations, commends itself on the electro-chemical theory as an important adjunct in amalgam compounds.

Perhaps it may not be out of place to give my mode of preparing amalgam compounds. This I will endeavor to do as succinctly as possible, with my *reasons* for each particular. I prefer *coin silver* alloyed with *copper*. The presence of *copper* insures a greater degree of *hardness* than is attainable when it is absent, and in the presence of zinc it is as fully protected from electro-chemical action as the silver or mercury is. I melt the silver, and if it be chemically pure I add copper, about 8 per cent., to the argento-cupreous alloy. I add, while in fusion, zinc, about 5 per cent., after which the metal is cooled as quickly as possible. The alloy is then reduced (by means of suitable cutters secured on a mandrel in a lathe) to fine cuttings, which are afterwards passed through a very fine screen or sieve of brass wire gauze. To this I add also about 5 per cent. of *similarly screened cuttings* of *metallic zinc*, which helps to impart the necessary electro-positive character to the mass. Finally, I add from 50 to 80 per cent. *chemically pure silver* in *atomic division*, regulating the amount empirically, as it seems to be needed on testing portions of the mass from time to time.

I prepare my chemically pure silver by dissolving refuse silver, scraps and old plugs of amalgam in nitric acid. Filter the solution; add sufficient hydrochloric acid or chloride of sodium to precipitate all the silver as chloride, which chloride should be rapidly and thoroughly washed by frequent changes of pure water. The reason why I use chemically pure silver in atonic divisions is this: The *cuttings* of silver, no matter how fine, will have appreciable interstices between them, and an amalgam prepared from fillings or cuttings alone will inevitably become porous by the process of saturation—the little fragments of silver being at first simply *coated* with mercury, finally absorb more, which necessarily drains the interstices. If, in the preparation of an amalgam, we can introduce some substance which will not greatly disturb the homogeneousness of the mass, and which will displace as much mercury as possible, we shall have secured two advantages. First, we obviate porosity. Second, we have to use *less mercury*. And in the result we obtain a *condition* of the mass in which mercury is obviously not available to the extent observed in some other forms of amalgam, for the production of such salts as may act prejudicially upon the tissues in the vicinity. In such an amalgam as I prepare the mercury cannot be twenty per cent. In a plug weighing five grains, we would find less than one grain of mercury. Allowing as large a surface of exposure as possible, which very seldom would reach as much as 0.25 square inches, the query arises: What fraction of a grain of mercury can possibly be absorbed from this mass in a given time? and

if it permeates the tissues as a *soluble salt*, how does it reach them? Is it through ingestion after undergoing solution in the mouth by the action of perverted saliva, or does the mercury in a metallic form pervade the structures of the tooth, or does it undergo solution in fluids pervading the tubuli of the teeth, and then find its way slowly into the adjacent tissue? We may declare our *opinions* on these points, but that is *not* demonstration. As I said before, much of the reasoning on these queries is too *specious*, and it seems to me to assume the character of *special pleading* to sustain an *a priori* hypothesis. The chloride is then covered with water, say half an inch deep, sufficient sulphuric acid and metallic zinc being added to insure the reduction of the chloride to pure silver. When this is fully accomplished, as may be known by the entire disappearance of the white chloride, and the flakey or granular appearance of the dark metallic silver, the zinc may be removed, and the silver remain a few hours in contact with the unappropriated sulphuric acid to insure the solution of any remaining undissolved portions of zinc. The silver is finally to be thoroughly washed with clean water, until *clean*, when it may be squeezed dry, or nearly so, in a napkin, after which it may be crumbled with the fingers, and more completely dried on a metallic plate over a lamp.

A few words relating to my mode of using this amalgam may not be out of place. Let the cavity be as carefully prepared as for a first-class gold filling. If the pulp cavity be endangered by the pressure necessary to insure a firm filling, cap with *osteoplastic*, or in any other mode that will secure permanence and security, dry the cavity by removing surplus saliva with a syringe, completing the process with any of the absorbents usually applied for that purpose. But, before the final drying of the cavity, mix the amalgam, and while it yet has a surplus of mercury, wash it with pure water, to which a few drops of ammonia (alkaline) have been added, until the amalgam is *perfectly clean*. Remove surplus mercury by squeezing in a napkin, or any other convenient, suitable material. The amalgam is now to be packed firmly in the carefully dried cavity, using a surplus, in order to take up and remove the free mercury forced out of the mass by condensation, taking care that this part of the operation is thoroughly and efficiently performed. Dress the surface of the plug to a *contour*, and burnish it. After the plug has become somewhat hardened the burnishing may be repeated until the surface remains bright and smooth. Plugs of this character, in an average mouth, retain their brightness and seldom discolor a tooth—the *vitality* of which is sufficient to retain a plug of other material.

In *dead teeth* discoloration is very liable to ensue. This may be explained by attributing it to the evolution of gases containing *sulphur compounds*, which, it is known, are often evolved in appreciable quantities,

from the decomposition of organic substances, and more especially those of animal origin. I have omitted to enlarge upon some points in my remarks, where it appears to me facts and reasons are so obvious as to suggest themselves.

In the amalgam question I do not propose to enter at large. Most of the discussions that are likely to arise in considering a subject in which the theory and practice of different persons is as different as can be, argument is so liable to degenerate into controversy, that the *main point* is lost to view in an endeavor to silence an opponent. A writer may sometimes be too busy or *too indolent* to fight his way out of a discussion, from which he will emerge without having achieved anything but opposition. In this matter I think I may claim the privilege of my age to plead an excusable amount of indolence.

MOHAWK, N. Y.

A CASE IN PRACTICE.

BY E. F. BARNES, D. D. S.

A short time ago a patient called on me to have a tooth filled, the left superior canine, decayed badly upon the approximal and labial surfaces. After removing the remaining portion of the old filling, I found an opening to the pulp cavity, but was devoid of any portion of the pulp. This state of affairs led me to question the patient in regard to it, who told me that six years ago a dentist in Liverpool had destroyed the pulp and filled the crown cavity, but did nothing whatever to the root—had experienced no trouble from it till about five months ago, when there commenced a slight swelling and severe pain at the root of the tooth, but was quietly dispelled by some antiphlogistic treatment and no further thought was given it. I removed all foreign matter, and treated with carbolic acid, and closed firmly the opening I had made, as I feared if I left the cavity exposed, it might cause an irritation and serious difficulty. A like case I very distinctly remember coming under my observation a few years ago, which resulted in alveolar abscess and partial necrosis of the superior maxilla. But to resume my case in practice.

The patient called the following morning to tell me the tooth commenced to ache soon after I closed it up, and continued to ache all night. I removed the stopping supposing the pain would cease, but, instead, it ached more violently than before.

I cleansed the tooth thoroughly with chloride of sodæ, and closed it up again without using carbolic acid. The pain was somewhat lessened but not entirely checked. I then painted the gums with *Tr. Iodini*, and in a short time the pain ceased altogether and has not returned.

In a few days I treated it again with the chloride of sodæ, and in about

a week filled the root with Hill's stopping, covering with oxychloride of zinc, first cleansing with carbolic acid, and filled the crown with gold.

I am at a loss to know what was the cause of the pain when I opened the cavity, whether it was caused by the carbolic acid, or in leaving it exposed to the atmosphere, as it was for a short time.

An idea a brother gave me, is, I think, a good explanation of the cause of such trouble.

The decomposed matter confined in the root lies dormant till exposed to the surrounding atmosphere, when it undergoes a chemical change, thereby causing an irritation of more or less magnitude.

I think if every portion of the decomposed pulp and all particles of foreign matter were carefully removed, and the pulp cavity thoroughly cleansed, there would be no irritation and consequent inflammation.

If we understood the cause of disease, we would be better enabled to treat successfully those cases which come under our observation and care.

NEW YORK.

CHLORAL-HYDRATE.

BY WILLIAM C. BAKES.

So much has been said and written in regard to the therapeutical and chemical properties of this new remedial agent, that there may seem but little more to be said in relation to it. We shall, therefore, only mention a few of its characteristics, and suggest the most convenient modes of administering it, with a view of securing its effects as a hypnotic and anæsthetic. Mr. E. Schering, of Berlin, who has manufactured it on a large scale, makes the following statement:—Chemically pure chloral-hydrate ($C_2Cl_3OH+H_2O$,) forms white acicular crystals, has a peculiar pungent odor, a somewhat bitter taste, produces, in concentrated solution, a slight irritation in the throat, fuses and sublimes readily, and keeps well in glass stoppered bottles—even in aqueous solution. In dispensing, glass, porcelain, or silver utensils, are to be used.

It is readily soluble in distilled water; only after contact with the atmosphere, traces of hydrochloric acid are discernible, which must be carefully neutralized by ammonia, if the solution is to be used for subcutaneous injections.

In a pamphlet issued by Dr. O. Liebreich, the following formulæ are given for administering chloral-hydrate:—

℞.—Hydratis chlorali, 38 grs.;
Aq. destil,
Mucil. acaciæ, āā ℥ss.—*M.*

S.—Take at one dose. (Ordinary hypnotic.)

℞.—Hydratis chlorali, 62 grs.;
Aq. destil,
Syr. aurant., āā ℥ss.—*M.*

S.—A tablespoonful at night. (Ordinary hypnotic.)

℞.—Hydratis chlorali, ʒss;
Aq. destil, ℥iv;
Syr. aurant.,
Mucil. acaciæ, āā ℥ss.—*M.*

S.—A tablespoonful every hour. (Sedative.)

Other formulæ have been used with success, and some physicians have obtained good results from the syrup of chloral.

℞.—Hydratis chlorali, 160 grs.;
Aq. destil, ʒiv;
Syrupus, ℥iij, ʒij;
Aq. flor. aurant., ʒij.—*M.*

S.—This may be given in doses of one teaspoonful or more.

A preparation less sweet than the syrup, pleasant to the taste and pleasing to the eye, is found in the elixir of chloral.

℞.—Hydratis chlorali, 160 grs.;
Aq. destil, ℥i;
Syr. aurant. rubr., ℥iij.—*M.*

Chloral-hydrate is also used for subcutaneous injections, and may be dissolved in distilled water in suitable proportions.

PHILADELPHIA, PA.

Dental Associations.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

At a meeting of the Association, held September 17th, 1870, Dr. Wm. Trueman exhibited a superior lateral almost cut through by a gold clasp. This clasp, assisted by one around the canine of the opposite side, supported a gold plate with four teeth. The tooth was worn away so as to resemble very much the letter Z; the crown and root being connected by a perfectly polished shaft, scarcely the sixteenth of an inch in diameter; the pulp cavity was completely filled up by a deposit of secondary dentine.

This wearing away had been accomplished in two years, though it is possible that the obliteration of the pulp cavity had been going on for some time, as the tooth had been much worn by mastication. It had never given any pain.

He thought this result was produced almost entirely by mechanical means. From the position of the clasps, the case was not held perfectly firm; every movement of the jaw causing considerable motion, especially about the tooth, wearing a groove nearly three times as wide as the band. The lateral had been banded merely as a temporary expedient.

The smooth polished surface is seldom, if ever, seen where the plate is held firmly in position and the tooth injured by chemical agencies.

In this case, the perfect polish, and the knowledge that a constant attrition between this tooth and band has been kept up for two years, lead us to regard this as a specimen of mechanical injury. The fact, that an examination of the gold clasps gives no evidence of wear, after having cut through a large surface of enamel so much harder than itself, leads, in the absence of any other explanation, to the supposition that some form of chemical action has assisted in the destruction.

He had recently noticed the screw-threads on the steel mandrel of his polishing lathe, although tempered quite hard, and in use only four years, nearly worn out, while the brass screws, used to attach the brushes, had not suffered in the least, although made at the same time. In this case it is most probable that the polishing powder became imbedded in the soft brass. When they are screwed in, the attrition is confined entirely to the steel.

Dr. James Truman considered the wasting of surfaces in contact with clasps, to be almost entirely due to chemical action. The result of mechanical wear by attrition must be comparatively small. That such exists, in combination with the chemical, there can be no doubt. In his judgment, the clasps held the oral secretions in contact with the tooth. The necessary result of this was an accumulation of acid fluids, and a speedy separation of the lime salts from the tooth. In mouths where abnormal acid secretions exist, this result will be very rapid. The space left by the removal of the tissue will generally assume the size of the clasp, naturally leading to the inference that the loss has been occasioned by the wearing process. The same result may be, and is produced, by the overlapping of fillings, where not the slightest motion exists. The change of secretions from their normal condition is painfully evident where a filling has been left in an unfinished, ragged condition for a few days. The sensitiveness will be found to have greatly increased at the edges of the cavity. This condition, in the short time intervening, can only be accounted for in the change of the secretions deposited under the rough and over-hanging portions, irritating the sensitive tissue in the dental tubes by their acid character. If this be long continued, loss of substance will result.

In the specimen exhibited, the pulp canal has become entirely obliterated

by deposits of secondary dentine. There is nothing remarkable about this, as it is the same process that follows the wearing away of teeth, the deposition found in the dentinal tubes at the approach of slow caries, or the hypertrophied condition termed exostosis. Wherever a slight irritation exists in or about a tooth in full vitality, there will be more or less extra deposits; but for this protective shield thrown up by nature, many teeth would be lost that are otherwise rendered useful and comfortable.

Dr. Wildman believed the destructive effects were mainly owing to the action of acid secretions, or by acid formed in the decomposition of particles of food finding lodgment between the clasp and the tooth. This, combined with the mechanical movement upon the tissue, weakened or partially disintegrated by the chemical action of the acid, would satisfactorily account for the rapid destruction of the part of the tooth so encircled.

The older members present will remember that some twenty-five years ago narrow bands were used. These were simply half round wire, turned with the flat side to the tooth and clasping it. To this the artificial teeth were attached. When broad bands were introduced, there was a feeling of confidence that the destructive effect of clasps would, by their use, be obviated, as they would embrace the tooth to such an extent as to prevent motion of the denture, and, consequently, the wearing away of the tissue by attrition; but it was soon found that the destructive effects of the broad clasp was as great as that of the narrow, giving evidence that it is mainly chemical action that causes the destruction of the tissue.

Dr. Githens objected to the general condemnation of clasps. Many teeth were not affected at all, either mechanically or chemically—the instances of great loss of tissue by this means being exceptional.

WHALEBONE RUBBER.

In answer to a question of Dr. J. Truman, in regard to "Whalebone Rubber:"

Dr. Wildman remarked that, at the request of the agent of the manufacturers, he had made some experiments with it. With his thermometer it was hard, but not perfectly elastic, when vulcanized according to their directions, viz: 55 minutes at 320° F., but when kept at 320° for 70 minutes, this property was fully exhibited. Thin strips, the thickness of the sheets, an inch broad and three inches long, if held firmly at one end, and the other bent at an angle of fifty degrees, would, if freed, instantly resume its shape, proving the rubber to be very elastic.

He had not tested its actual relative strength with the ordinary red rubber, but believed it much stronger. Its greater elasticity enabled the operator to make it much thinner. He had made an obturator of it in a

case where thinness, strength and elasticity were necessary. The plate was made very thin and was very elastic, and so far appears to be a complete success.

He did not know of what the coloring matter consisted, but was assured by the agent that it contained no vermilion. If mercury existed in it, it could be readily detected. After being vulcanized, the color is very similar to compounds he had made by substituting red oxide of iron for vermilion. When the bright rouge or oxide of iron was ground in linseed oil, previous to mixing it with the caoutchouc and sulphur, before vulcanization, it was much darker than the whalebone rubber, but when hardened the color was the same.

Dr. Jas. Truman had experimented with it to some extent, and so far as he could judge it was much tougher than the ordinary red rubber. The color, in his judgment, was no objection, although much darker than generally used. Plates could be made very much lighter, and still retain all the requisite strength. It could be used to repair the red rubber to great advantage. The disfigurement, produced by unequal vulcanization, is obviated by the dark color of the whalebone rubber. The difference in shade between the two is very slight.

Dr. Pettit was not satisfied that this rubber was free from mercury. He understood, from conversation with the agent, that a small portion of vermilion was added to the coloring matter.

ROLLED GOLD.

Dr. Wm. Trueman desired information in regard to rolled gold, or what is known as "Pack's Gold."

Dr. James Truman, in answer, stated that he had used one box of this gold, but did not feel prepared to give a decided opinion for or against. When he first commenced its use it was with feelings strongly prejudiced in its favor; but from some, as yet unexplained cause, it did not fulfill his expectations. The cohesive property seemed perfect, the gold was very soft, yet it was difficult to secure a perfect union of the lamina of foil. Yet, notwithstanding the repeated failures to make a satisfactory filling with this form of gold, he was still of the opinion that this mode of preparation had value, and would yet be made available for our purposes.

This form of gold is, however, nothing new, it having been used nineteen years ago. Through the kindness of Abbey & Sons, he had been able to refer to their letter book, and from that gathered the fact that they had rolled out No. 30 gold for Dr. Arthur as early as February, 1852. They had also supplied *beaten* gold, of No. 15, in 1850, and No. 30, *beaten*, in 1850–'51. At that early period in the use of adhesive

foils, the successful introduction of such a heavy material was an absolute impossibility.

The theory entertained by the two manufacturers of this kind of foil is substantially the same. It is well known that metal in rolling will elongate without lateral expansion; or, in other words, that a wire passed between the rolls will lengthen, but will not perceptibly increase in width. The supposition is, that the crystals, in the process of melting, aggregate together in one direction, and in the process of rolling they are simply extended in length. As long as this is continued in the one direction, the product will be a soft, adhesive material; but any change from this course will break up the cohesive property; or, in other words, derange the crystals. That this theory of the manufacturers is substantially true, seems borne out by results, although there are some theoretical difficulties in the way of its entire acceptance.

In experiments with tin he had found the results the same as gold. The tin came out soft, and the cohesive property apparently largely increased. The same difficulty in manipulation, and the same unreliability, was present as in the denser metal. He had been unable to pack rolled tin at all, unless carefully passed between the rolls in the one direction.

That gold and tin, prepared in this way, can be made useful admits of no doubt, but to what extent remains for further investigation yet to develop.

The inquiry now being made in regard to gold, and forms best suited for adoption, can but result in great good. We have suffered in the past through a want of correct information in regard to the difficulties met with from deterioration of gold, and any light thrown on this subject will be gladly welcomed. Mr. Pack says it is impossible to make an even foil under the hammer; that there will be "papery gold," and harsh, unyielding gold as long as this process is used. This seems reasonable in theory, but it is doubtful whether such results may not legitimately be traced to other causes in the process of manufacture.

Dr. Wm. Trueman had used half a box of "Pack's Eureka Gold," rolling it in cylinders. He had found it to work nicely, but entirely too troublesome. A few months ago he had been shown, by Dr. David Roberts, a half sheet of No. 40 rolled foil, the last of several ounces made to his order by Messrs. Abbey & Sons some twelve or fifteen years ago. The Doctor reserved it for especially difficult approximal cavities, using it in narrow strips or tapes, and thought in those cases it possessed some little advantage over ordinary foil; but it required more care, and could not be worked as rapidly. Although this had been kept so long, he had not noticed any change in its working properties. J. T.

Editorial.

ON NITROUS OXIDE.

We publish the following letter, which is a type of many which have been received the past few years:

To the Editor of the Dental Times:

Dear Sir:—I have recently determined to administer nitrous oxide, and have procured a large gasometer, capable of holding 40 *gallons* of gas over a corresponding quantity of water. I have given the gas several times, but am not quite satisfied with the results. I have administered the gas from a seven-gallon rubber bag with a plain mouthpiece—the patient breathing from and into the bag. I have in many cases had the following symptoms: blueness of the lips, lividity of the countenance, muscular twitching, irregular respiration, and an appearance as if the patient was about to have a convulsion. This condition has in all cases come on suddenly, and, upon removal of the bag, the person has quickly recovered consciousness, and has appeared to suffer no bad after-effects—except that in a few cases there has been a desire on the part of the patient to take every few moments a long breath, as if the lungs were not able to take, in natural respirations, the requisite quantity of atmospheric air. This has, however, passed off in an hour or so after the administration of the gas. In one case the patient, a strong healthy woman of 28 years of age, went from my office well, or, at least, apparently so, but was taken the same night with congestion of the brain—so pronounced by her physician—and continued very ill for some weeks; recovered eventually, but still suffers with "low spirits and headache:" lays her sickness and unpleasant feelings "to the gas." I would remark that the gas used, in all cases, was *fresh*, and washed according to your advice in your work* and your oral teachings. My object in addressing you is, to ask you if you had met with such an experience. 1st. So far as symptoms detailed during time of administration. 2d. Have you noticed any unpleasant results immediately after its exhibition? 3d. Have you met with, or have you heard of any bad results following the administration of gas, say several hours or even days after, that might be reasonably traced to the ill effects of nitrous oxide? 5th. How long will gas keep useful over water? By answering these questions you will confer a favor, for which I shall tender you my warmest thanks.

Respectfully, yours,

——— ———.

We take pleasure in answering the above communication, for it enables us to point out to *many* the reckless manner in which gas is administered—the popular idea being, both by dentists and physicians, that gas is perfectly harmless for any and everybody—one operator alone stating that, in "four years," he had operated on 15,800 patients, which, allowing the average to be four teeth from each individual, would make a sacrifice of 63,200 teeth or roots. But it is not of this wholesale extraction to which

* Barker's Instructions on Preparation, Administration and Properties of Nitrous Oxide. Third edition.

we shall now refer, but shall remark, that the selection of cases for the administration of nitrous oxide calls for just as much discrimination as is required for the administration of sulphuric ether. And the only advantages which nitrous oxide possesses over ether is, that an anæsthetic condition can be more quickly produced by the first named, and that, when properly exhibited, nitrous oxide is more rapidly eliminated, and hence is well adapted for minor surgical operations. In reply to our correspondent's first query we would state, that we have repeatedly seen the symptoms so accurately described by him as occurring to his patients at time of administration, and though not willing to acknowledge to a constitutional timidity, yet can truly say, that we have never witnessed them without alarm; for such symptoms are sure indications of a carbonized condition of the blood, an unfavorable influence on the medulla oblongata and nerves controlling respiration, and a like "reflex" influence on the cerebro-spinal nerves and nerves of the great sympathetic system. Such involuntary movements, happily described by our correspondent "as an appearance as if the patient was going to have a convulsion," are the efforts made by nature to arrest, modify, or give evidence of the presence of some poison or noxious agent that, if not quickly removed, will overthrow vital force. Fortunately, the alarming symptoms are so marked that the operator quickly removes the bag, and while it may be said the patient is on the brink of the grave the teeth are extracted. This assertion may to some seem extravagant, but we do not doubt that *two minutes* of continued administration of the gas, to a person exhibiting such appearances, would induce a fatal termination. Precisely the same results are induced upon the inferior animals, and if continued beyond this point death ensues. But let us see what is the cause of these untoward symptoms. Nitrous oxide, unadulterated with air, a powerful supporter of combustion, is rapidly inhaled into the pulmonary air cells, through which absorption takes place into the blood with great facility. This blood, surcharged with this great combustible agent, is carried over the system, and, as a consequence, combustion occurs between the remote tissues and nitrous oxide conveyed to the immediate neighborhood by the blood, carbonic acid gas being the result, which is taken up and returned to the lungs, where, if no *valved mouthpiece* is used, it is carried by the exhalations back into the bag to vitiate its contents, and cause the pulmonary air cells to contain, in the course of a few inspirations, a poison gas, a mixture of nitrous oxide and carbonic acid gases, the blood at each inspiration becoming more and more carbonized. While, then, these symptoms may result, even when gas is properly administered from a valved inhaler, allowing none of the respiratory product to enter the receptacle from which gas is inhaled, we have yet, in an extended experi-

ence, to meet with such symptoms, and believe *that they are mainly the result of breathing back and forth into small rubber bags*—carbonization of the blood occurring from interference with the endosmotic process in the lungs.

The most bigoted man on the subject of nitrous oxide with whom we ever conversed was an eminent physician of New Jersey, who saw a patient (his wife) take gas at one of the dental slaughter-houses which flourish—to our shame be it said—in all the cities and large towns from one end of the land to the other. This gentleman remarked, that he had never seen one apparently so near death and yet recover. The same lady, on another occasion, took gas from a large gasometer, breathing easily through a tube and valved inhaler, no unpleasant symptoms being present—the countenance, color of lips, expression of eye and hue of skin, respiration and circulation being continuously normal.

We answer question number two by stating, that the involuntary long breaths every few moments were only nature's efforts to overcome excessive waste of parts engaged in respiratory movements, and to supply proper "residuary" air to the pulmonary air cells; or it might be due to the continued presence of an irritant acting by reflex nervous action upon the respiratory nerves. This condition was mainly due to *improper* administration of gas—the person breathing their own exhalations instead of pure nitrous oxide. But there is one objection made by some to the use of the valved inhaler, which we consider should have no weight when safety, comfort and cleanliness call for such a method of exhibition; it is that "patients breathe more gas," and "do not stay so long in a state of narcotism, hence have to administer gas over and over," which is true; but if safety is not to be considered carbonic acid gas might be used, as it is just as rapid in producing narcotism, and the effects would continue longer than when diluted with nitrous oxide.

In reply to question No. 3 we would state, that we have heard of many cases of sickness following the administration of nitrous oxide. Several such cases have been published. We quote one.

"*Coma, from Nitrous Oxide.*—By Prof. Thomas, Bellevue Hospital, Dec. 11th, 1869.—E. McLester, 19, domestic, Ireland, admitted to Hospital 10th December. She was in perfect health up to Tuesday, 7th December, when she took nitrous oxide, from the hands of a dentist, previous to having a tooth pulled. She has been comatose ever since, says there is nothing the matter, but has a distinct remembrance that she had or was about to have a tooth removed, and, from repeated exclamations of "my tooth," seems yet to suffer from it. In answer to questions as to where she is, she replies, "at my mother's." She presents a robust appearance, remains quiet, with a constant tendency to lapse into unconsciousness, from which a considerable amount of shaking is necessary to arouse her. Questions have to be repeated, and elicit imperfect and

unsatisfactory answers. The pulse is perfectly natural. She had double strabismus, which has now disappeared. The face gave the impression of being flushed; but she seemed naturally florid. *Treatment.*—Let her alone until she recovers. I have known a case in which the coma lasted four days. This patient went out perfectly well a few days afterwards."—*Medical Gazette.*

[Such cases do not always come out of it when let alone. Miss D. Smith informs me that a lady, at Belvidere, took *gas* a few months ago, who was affected in a similar manner, but died on the 3d or 4th day. The dentist who administered it took up his bed and walked, and has not been heard from since. The dental and medical journals relate numerous similar cases. In view of these facts we cannot credit the sweeping statements of Dr. Colton, that his association has administered it in 75,000 cases without accident.]—*The Dental and Medical Journal.*

We would further remark, that we are keeping a record of cases, well authenticated and markedly significant, of bad results from administration of nitrous oxide, and will thank our friends in different sections of the country to forward *such cases* to our address, that they may (without giving publicity to names of patient or operator) be published to warn the dental public against the great error that nitrous oxide can be given to any and everybody. And doubtless many would be surprised at what evidence has already been accumulated.

To question No. 5 we would reply, that we have repeatedly given gas six weeks old; and on this day, September 25th, have given gas twice from a gasometer filled August 5th—narcotism being in both cases readily and satisfactorily induced in less than two minutes. But gas will not keep this long unless the gasometer is perfectly air-tight, and the water should not be removed from the gasometer, unless gas is made very frequently, oftener than once in one or two months. We have answered our correspondent at length, though we have not touched upon points which we consider of vital importance. From an extended acquaintance and correspondence with dentists, we believe the *rule* is to use the rubber bag and old-fashioned mouthpiece, and that valved inhalers are the exception. That it is the rule to give gas to everybody, young and old, sick or well; but we would urge the most careful discrimination in all cases, rejecting those where doubt exists or where other anæsthetics would be contra-indicated, adopting the remark which has been made of mercury—"That it is a two-edged sword, capable of doing a great deal of good or a great deal of harm." G. T. B.

HEAVY FOILS AND THE WHITE METAL MALLET.

Every day's experience convinces us of the value of heavy gold as an adjunct of the lighter foils in filling teeth. We have not used above No. 60, and this only in large cavities, but with the aid of a three oz. white metal mallet, which is preferred by our patients universally to the light

mallet or automatic plugger, we have produced the most satisfactory results. We recognize the fact that this time the "light" traveled from the West toward the East, instead of from East to West, for it was mainly to the public efforts (received at first with derision) of our friends in St. Louis, Messrs. McKellops, Judd & Chase, that attention was directed to the subject, and though neither of them claims to be the author of the method of filling, all articles of any value to dentists having been introduced in some past age—see Dental Periodicals—yet they were the ones to fight the method into public favor. G. T. B.

THE AMERICAN DENTAL ASSOCIATION.

The annual meeting of this body occurred at Nashville, Tennessee, August, 1870.

There was a full attendance of professional brethren, particularly from the South, the extreme hot weather keeping many away from the North. We believe the selection of officers was a happy one. No more fitting election could have been made than that of Dr. William H. Morgan, of Memphis, Tennessee, to the presidential chair, while the other selections were eminently appropriate. The discussions, we learn, were enjoyed, and doubtless will produce good results. There is one point to which we would direct attention, and which, sooner or later, if not corrected, will act to the serious detriment of the Association. It is the observance of the rule prohibiting the publication of papers belonging to the Association in Dental Journals until published in the annual transactions, which generally makes its appearance long after the meeting has taken place, and the subject matter and attendant discussions have been forgotten.

We hope to see the day when the Association will employ a competent short-hand reporter, and that immediately upon adjournment, any Dental Journal can, at a moderate expense, obtain a copy of *all* or *any part* of the proceedings to publish to their readers. The Association cannot afford to give the cold shoulder to the Dental Periodicals, for, as in all matters, political, social or religious, the press is the great lever; so in matters professional, it is the potent agent wielding its mighty influence for the general diffusion of all useful information. G. T. B.

SURGICAL CLINIC.

We would announce to our friends that it is the design of Professor Mears to hold a surgical clinic on every Wednesday, from 10 to 12 o'clock, A. M., during the session of the Pennsylvania College of Dental Surgery. At this clinic, the diseases of the oral cavity and adjacent parts, will receive particular attention. We respectfully request our friends to assist in obtaining cases, and as all operations will be performed gratuitously, it is deserving of especial interest.

☞ Dr. G. S. Beaty, of Toledo, Ohio, has donated to the museum of the Pennsylvania College of Dental Surgery a model of an upper set—a bad case of irregularity—where the four incisors presented an imbricated appearance. Attached to the model is the apparatus with which he corrected the irregularity. Although the apparatus is very simple and ingeniously constructed, and at once upon examination shows its effectiveness, we are unable to give an intelligible description without an engraving. As a suggestion to the comprehensive mind, we would say it consists of a band in front of the teeth, with slots in it opposite their approximal surfaces, and at these points are small screws, to which are attached ligatures, which pass around the teeth with a lap, so that by turning the screws force will be brought upon the teeth to separate them, at the same time rotating them upon their axis.

We tender our thanks to Dr. Beaty for his donation. E. W.

Book Notices.

We have received from the author, Dr. F. R. Thomas, of Phila., a neat and practical little work, entitled: "Manual of the Discovery, Manufacture and Administration of Nitrous Oxide, or Laughing Gas, in its relation to dental and minor surgical operations, and particularly for the painless extraction of teeth." This gentleman has had an extended experience with this agent, and has detailed in a clear manner his views upon the subject, and while we totally dissent with some of the positions assumed, yet, taken as a whole, the work gives evidence of careful study and revision. We are sorry to see the illustration on page 72—exhibiting the operator and assistant administering nitrous oxide to a patient from *a rubber bag*—a method which in our judgment is not only offensive to sight, but is opposed to cleanliness and enlightened practice. We sincerely hope the time is not far distant when the rubber bag will be laid aside, with the old fashioned key, as entirely obsolete. Our objections to the position assumed, that it is necessary to make fresh gas, and that *old* gas does not possess anæsthetic properties, will be seen elsewhere. The addition of a chapter on suggestions in regard to extraction, is replete with good and practical instructions. There is one point upon which the author does not seem to place proper stress, *i. e.*, the importance of making pure gas by a careful regulation of heat to the nitrate of ammonia, and the proper washing of gas, through solutions, to remove impurities. This subject has received the careful attention of many writers; prominent and foremost we cite the name of our old and worthy friend, Prof. Geo. Watt, whose cautions ought to be remembered and recognized by all. We quote from the work

the principal reference to the use of purifying solutions. "In purifying it, it is unnecessary to use anything but a solution of the sulphate of iron in one bottle, and fresh water in the other two. Some chemists recommend the use of caustic potash in addition, for the purpose of neutralizing any chlorine gas that may be present. In my judgment, however, the use of these chemicals is superfluous, as I have found by experience that the action of the gas is precisely the same, whether it is washed through fresh water and allowed to stand a sufficient length of time (about five or six hours) for the water in the gasometer to absorb any impurities that may have passed over with the gas." "In manufacturing nitrous oxide in an apparatus (Barrel) like this, no chemicals are needed, inasmuch as it receives sufficient purification in its passage through so large a quantity of water." "Now apply the heat gradually, avoid fracturing the retort, and closely observe the process. When the ammonia is melted it very soon commences to boil, after which regulate the heat to keep it quietly boiling until it is nearly all decomposed. Should it get to boiling too rapidly, take a dry cloth and raise the retort out of the sand-bath until the violent ebullition diminishes, when it can be replaced." Were this manual written for those who were experienced in making gas, and were aware of the chemical changes which would ensue from too great heat, poisonous gases being generated, &c., the above description, on the application of heat for the decomposition of the salt, would be sufficient; but the author informs us in his preface, that "The object in writing this little work, is to endeavor to supply a want long felt to exist in the literature of the subject. The necessity of a plain and practical manual on the manufacture and administration of nitrous oxide, has been apparent to all who have used this agent." And this manual is designed to supply this want, which is so "apparent," and hence, should not be defective in these essentials.

G. T. B.

THE MEDICAL TIMES, a semi-monthly Journal of Medical and Surgical Science, No. 1, Vol. I, published by J. B. Lippincott & Co., Philadelphia, has been received. From the prospectus which was issued the professional public were led to have "great expectations" of the new journal; and while, perhaps, the over-sanguine may be somewhat disappointed in its contents, it yet presents a creditable array of original communications, prominent among which are the Clinical Lectures by Profs. S. D. Gross and Alfred Stillé, and Clinical Reports and Reviews. The letter from Vienna is particularly interesting. We congratulate the new journal on its happy selection of name—so near our own—and present our wishes for its complete success.

G. T. B.

Selections.

ON THE INHALATION OF THE NITROUS OXIDE GAS WHEN THE LUNGS ARE DISEASED.

BY B. HOLDEN, M. D., OF NEWARK, N. J.

The cases which form the basis of the following article will probably commend themselves as of some interest to any physician called often to answer the question, "Can I inhale gas at the dentist's with impunity?" The observations from which the cases are selected have been numerous, and the cases themselves are, in a measure, typical of classes.

The availability of this gas for slight and brief surgical operations—its speedy action and the equally speedy disappearance of all effects of anæsthesia, are making its use so common that all information regarding it must prove of value, and especially so in view of the awakened interest in the subject of inhalation of gases as curative agents. I may be pardoned for parenthetically stating that, while my own experience with nitrous oxide as a therapeutic agent in phthisical cases has been anything but favorable, and I have seen hæmoptysis immediately follow a carefully conducted inhalation of oxygen, yet I by no means felt assured that their inhalation *per se* was especially injurious at the commencement of the present investigation. Nitrous oxide in its purest state produces rapid venosity of circulation; the great founder of the German medico-anatomical school, Rokitansky, asserts that a condition of venosity is inimical to tubercle (p. 241, vol. ii): theoretically, therefore, the gas should be beneficial in tuberculosis. Oxygen produces, of course, the opposite condition.

Tuberculosis, according to not a few brilliant laborers of the present day, is but a commencing death of organism—an excessive retrograde metamorphosis of tissue-destruction without adequate repair, and which the oxygen of mountain air and of unrestrained out-door life is credited with power to arrest; theoretically, therefore, oxygen should be beneficial by inhalation. M. Demarquay has recently experimented in this direction, and paradoxical as the ideas in the cases as stated may be, they are easily reconcilable by the belief that *neither* of the gases as used has been, or is likely to be, curative. The general effect, however, of the agent under consideration, when persistently and frequently inhaled as a therapeutical means, has little to do with the answer to the question already quoted, and which can be more pertinently rendered, "Can I, having diseased lungs (and especially if subject to hæmoptysis,) inhale nitrous oxide gas at the dentist's with safety?"

Most of the cases from which the following have been selected have been observed at the dental rooms of Dr. J. B. Da Camara in this city, (Newark, N. J.,) whose extensive experience with the gas is probably second to none in this country. The gas was made in the ordinary way by heating nitrate of ammonia in a retort, maintaining a temperature of 400° to 500°, and thoroughly washing through successive jars of water. The ammonia was selected with especial care, in order to avoid accidental contamination with hydrochloric acid, the presence of which invariably results in an admixture of free chlorine with the peroxide, and consequently in an irritant effect upon the lungs. It is well to observe that frequently persons presented themselves who had at other places tried inhalation in vain, violent headaches, convulsions, suffocating sensations, &c., had inva-

riably necessitated abandonment of the effort; yet they succumbed with greatest ease when the pure gas was administered. This point is the more important, since none of the effects noted in the subjoined cases can be attributed to impurity of gas.

From the washing-jars the gas was conducted to large metallic retorts, holding from 400 to 500 gallons, and made fresh every day, since it is a singular fact that age seems to impair its anæsthetic power, and gives rise to symptoms never observed when the gas is used in freshness and purity. This impairment is far more marked when rubber bags are used as holders, and seems to admit of explanation in such cases; but in metallic receivers suspended in water already saturated with all the gas possible to be absorbed (three-fourths of its bulk,) without escape and without diminution of volume, reason for loss of anæsthetic power is not so apparent.

The inhalation was performed with total exclusion of atmospheric air through a mouthpiece of silver which fitted accurately about the cheeks and lips, expiration being performed through a valve in the same piece. The patient was always in the sitting posture, to facilitate easy and frequent auscultation and percussion.

The two following cases may be interesting as illustrative of the general effects of inhalation upon a healthy person.

Case I.—A girl, æt. 12 years; ruddy complexion; about average size: lungs, heart, and indeed all organs, in sound condition; no nervousness or apprehension; pulse 65, after steady inhalation for one minute; pulse accelerated without increased number of respirations; rapid discoloration of lips, then of extremities; no distension of superficial veins; marked lividity of whole face; eyes remaining open (not a universal rule, but rather unusual,) disclosed slow dilatation of pupil; eyeballs visibly receding as after death, and the countenance corpse-like; anæsthesia complete before expiration of second minute, and preceded by slight struggling as if to prevent suffocation; pulse 80, soft and regular; inhalation discontinued; duration of anæsthesia fifteen seconds; time from instant of complete anæsthesia to complete and perfect recovery, between one and two minutes.

Lungs in this case not examined during anæsthesia; as a result, however, of many examinations of others, the following statement may be considered illustrative:—

The first change, and one that usually occurs after the third or fourth full inhalation, is a marked softening of bronchial air sounds, and intensification of the vesicular, followed by speedy intensification of the former and obliteration of the latter. Then follows the sub-crepitant rhonchus indicative of mucus in the finer bronchial tubes, then rapidly the sounds of air-bubbles in the larger tubes, prolonged respiration, and vocal resonance.

In several cases suffering from the commonly-styled "stuffed" feeling that often ushers in a subacute attack of bronchitis, and in which a marked sibilant character was observed in the passage of air through the finer bronchi prior to inhalation, a remarkable cessation of such sound was observed after a few inhalations, whether correctly or not, and was attributed to sudden relaxation of bronchial spasm. This peculiarity will be again referred to in connection with Supplementary Case II.

The second of the cases designated illustrative is more rare, because

anæsthesia is peculiarly rapid, and unaccompanied by lividity or other noticeable symptom.

CASE II.—Male, æt. 27, unmarried: temperament sanguine; complexion fair; health good, and believed sound in all respects, but mother died of consumption, and partly had suffered from (strumous) necrosis of femur, and might, perhaps, be said to be more than usually susceptible to influences of temperature.

Examination prior to inhalation revealed weakness of vesicular quality, want of proper breeziness and tone to general respiration, a condition suggestive also of imperfect resilient power of lungs, but no disease; pulse 72.

One inhalation produced incoherence of speech, and four anæsthesia. Examination during inhalation gave results similar to those stated as common to sound lungs, but no lividity of extremities or lips existed; vesicular quality of respiration absent during the whole period of anæsthesia, however, and gums and inside of cheeks of clearly venous hue; pulse 80 to 95, and variable. Anæsthesia prolonged two minutes: recovery complete in two minutes, and normal condition of lungs restored within that time.

The following notes also, taken at intervals during the five months occupied in the investigation, may be of interest:—

a. Nitrous oxide inhaled in the manner indicated produces no tendency to laughter, admixture with atmospheric air being essential to the development of this well-known characteristic.

b. There is usually considerable struggling at the approach of anæsthesia, occasionally suggestive of desire to escape suffocation, but which is probably owing to an automatic impulse occasioned by the thought of possibility of suffocation already existing in the mind of the patient, since the subject last in the mind becomes the foundation of any dream that may occur; for example, the bubbling of water produces in the semi-unconsciousness just preceding and following anæsthesia a dream of music; the steady tick of a clock, the roar of the surf on the beach whispers of pleasure or pain, the scenes or instruments that usually give rise to these emotions. It is probable, also, that in this way we may explain the evident erotic tendencies that are so frequently developed, the most chaste and virtuous being liable to gestures and movements which, if not so evidently automatic, would be considered most lascivious. (See supplementary case I.)

This tendency is, without doubt, the result of the thought of possible violation; for the subject of it is almost universally a female, and there are few who sit down in a dentist's chair who have not heard or read of the stories regarding such attempts upon females while in a state of unconsciousness, and almost always where this erotic excitement is developed there are none but males present, the patient partly reclines with feet somewhat elevated, and a fear, perhaps only momentary, that there is danger, would be a most natural one.

c. There is almost always intensification of the senses, especially of sight and hearing, just prior to unconsciousness, and in spite of the seeming contradiction in the statement this intensification may possibly continue in many cases throughout, (the faculties of memory and co-ordination being in abeyance,) for however oblivious upon recovery a person may be of having suffered pain, yet the contortions of countenance and occasional

screaming show that feeling is not destroyed; of course it is not asserted that anæsthesia cannot be made so complete as to utterly destroy feeling, but usually this is not the case, although to all intents and purposes unconsciousness is perfect, and no memory of pain exists upon recovery. I am indebted to the dentist, at whose office many of these experiments were made, for a suggestion which is probably a correct one in reference to the anæsthesia produced, which is that there is simply a lightning-like flow of ideas with impairment and in many cases obliteration of memory, for a person *may stand erect* and gradually inhale sufficient gas to produce complete oblivion, and experience all the minute shades of thought and feeling that belong to every-day life, and this through an apparent series of days and weeks and even years, live, travel, be ill and recover, enjoy, suffer, and in fact undergo a distinct existence, and yet recover consciousness in time to prevent falling. If in this ecstasy a tooth be drawn, or other surgical operation be performed, the painful sensation is intruded upon with such lightning-like rapidity, and is so speedily merged into the tissue of the dream, as to be overwhelmed and forgotten.

d. Vision is, as I have said, frequently intensified, and perhaps invariably so long as a state of semi-consciousness is maintained; the minute twigs on somewhat distant trees, the fine letters upon street signs, faces out of recognizing distance, &c., are brought within range often to an astonishing degree. Hearing is also intensified, although greater care is necessary to maintain only a certain amount of æsthesia, for the line is easily crossed, and dullness of hearing is the consequence.

e. There is occasional (not invariable) dilatation of pupil.

f. There always exists an increased tendency to bleed, whatever be the condition or temperament of the patient, and whatever be the part of the body cut or abraded. The case of the young girl cited first, as illustrative, was the subject of severe hemorrhage from the gums during the operation of extracting teeth, and at intervals, for three weeks following (on two occasions to syncope.)

g. Three patients, the subjects of epilepsy, hysteria, and epileptiform hysteria respectively, came under observation, in regard to which the following extracts are made from notes:—

The first, a girl of 19, who had been subject to convulsions since childhood, exhibited no tendency to convulsion during, or subsequent to, anæsthesia, although she had suffered from attacks as often as ten or twelve times a week for several weeks prior to inhalation.

The second, an octoroon aged 21, had been the victim of as frequent attacks of epileptiform hysteria; she had two convulsions in quick succession upon the approach of unconsciousness, and several immediately after (no dilatation of pupil, and no lividity).

The third, typical of a very large class of patients, exhibited violent hysteria immediately upon regaining, or rather approaching, consciousness, and for several hours suffered recurrence of attack.

h. While an antipathy that may be termed idiosyncratic may actually exist to the inhalation of the gas, inability to produce anæsthesia almost invariably arises from impurity of the anæsthetic, or from its staleness, and a large majority of all the headaches and subsequent bad feelings that are sometimes complained of, undoubtedly arise from the same cause. Case IV is, however, an exception to this rule.

CASE I.—Male, æt. 35, 5 feet 10 inches high, 140 pounds weight, florid complexion, healthy appearance, had occasionally raised blood last winter and ten years ago, at each of these periods, covering a space of six weeks; had also had two attacks of unconsciousness attributed to sunstroke; has often inhaled the gas.

Examination of lungs prior to inhalation showed disease of one apex probably tubercular, incipient, and quiescent. Five full inspirations produced marked lividity of lips and speedy anæsthesia, with twitchings of muscles, and symptoms of threatened convulsions. Examination during unconsciousness showed in vicinity of disease first, rapid extension of area of dullness, accompanied by increased resonance of bronchial air sounds, intensification of vocal resonance (the occasional moans of patient being transmitted with singular acuteness,) then fine crepitation in vicinity of disease gradually appearing also in healthy portions of both lungs and becoming a marked coarse rhonchus at apices with total disappearance of vesicular murmurs.

Upon withdrawal of the anæsthetic, recovery was remarkably rapid (30 seconds.)

Examination immediately after return to consciousness gave a generally intensified respiratory murmur with diminished vesicular quality, and rales more or less pronounced, bronchial murmur tubular, two points in one lung near the base an occasional twang as of a snapped guitar string, restoration of normal quality and condition too rapid to permit proper percussion (15 seconds,) restoration of natural color to lips and face equally rapid.

Examination twenty-four hours after inhalation showed normal condition restored in healthy portions, and no marked change at point of disease.

Patient states that having had occasion to inhale frequently both in this and a former winter, he had been subsequently troubled with raising of blood and irritative morning cough, which discontinued upon renouncing the practice.

CASE II.—Male, æt. 54; mastication of food impaired by loss of teeth, and therefore dyspeptic; has a cold, states that lungs were always weak; never raised blood, has the appearance of moderate health. Examination prior to inhalation: right lung sound, left gave pronounced bronchial breathing at apex; expiratory murmur jerking and wavy; vocal resonance behind scapula over a space of two square inches, no signs of softening or vomicæ; pulse 90.

Under inhalation, nervous struggling somewhat during second half minute; lips and nails livid; becoming partly unconscious, tore away the inhaler; after two minutes again inhaled; unconscious in one and a half minutes; recovery commenced almost immediately upon withdrawing gas; laughter and crying; volubility with connected and intelligible speech two to three minutes, during which examination was again made; pulse 100.

Examination during unconsciousness gave duplication of sounds stated under Case I.

Examination after discontinuing inhalation gave bronchial breathing well marked and inclined to tubular, over whole of upper portion of both lungs; vesicular character of inspiratory act replaced by sibilant murmur; crepitation in vicinity of solidified tissue; gradual return to normal character; party expresses a sense of great relief in breathing, and feels generally better than before inhalation.

CASE III.—Young lady, æt. 24, states that she has weak lungs; never raised blood: takes cold easily; is subject to pain in left shoulder; complexion good; appearance that of average health.

Examination before inhalation: right lung sound; left, under scapula, shows vocal resonance, pronounced bronchial breathing, prolonged expiratory murmur, and in short the evidences of consolidation of tissue without softening or local inflammatory action.

Under inhalation pulse ran down rapidly, becoming weaker, till almost imperceptible; much gas required; lividity not marked; nervous twitching and convulsive struggling considerable.

Examination after anæsthesia (two minutes) confined to spot above referred to: breathing amphoric; fine crepitation in vicinity of consolidation, (vesicular murmur elsewhere clear and distinct;) no increase or change in sensitiveness of part; sounds strongly suggestive of the accession of diseased action upon a latent phthisis, such as is usually ascribed by the patient to a new cold.

CASE IV.—Female, æt. 35; has had occasional attacks of dyspnœa upon exertion, referred by her physician to disease of heart; has tried before to inhale nitrous oxide without success.

Examination prior to inhalation showed signs of incipient phthisis in both lungs at apices; heart sounds suggestive of dilatation, (weak action and heightened systolic pitch;) apex beat, however, distinct; no undulatory impulse, no prolonged post-systolic silence.

Inhalation of more than a few breaths of gas impossible, although pulse remained unchanged, and no signs occurred of systemic obstruction; upon removing the tube patient gasped convulsively for about a minute.

Examination during inhalation gave simple respiratory murmurs, puerile in character, with no other change; heart sounds more forcible with less quickness, exaggerated but not sharpened, giving to the ear a sensation of fullness or roundness.

Inability to inspire seemed to arise from loss of control over respiratory muscles, the pulse not accelerated nor heart's action labored.

The same phenomena occurred at two previous inhalations.

CASE V.—Female, married, æt. 36, delicate in appearance, had taken gas before with no ill effect; knows one lung to be weak; no preliminary examination.

Examination during inhalation and while recovering consciousness: Right lung presented sounds common to well lung under anæsthesia, (*i. e.*, exaggeration of respiratory murmurs, the tubular character of bronchial air column predominant;) left lung gave all the sounds of cavity with progressive softening and singularly modified metallic tinkle; as patient was recovering consciousness she moaned, and vocal resonance was found well marked; great dullness on percussion, and apparent consolidation over large portions of upper lobe of left lung.

These sounds gradually changed, and in two minutes it was evident that no cavity existed, but that a small space of lung tissue was impervious to air, and had been, or was, the seat of disease.

For several minutes the evidence of vascular congestion of the vesicular capillaries was well marked, and for five minutes after commencing to recover fine crepitation in the vicinity of consolidation showed an increased secretion of mucus.

Lividity of lips and finger-nails not well marked, and pulse fluctuated, probably from involuntary struggling. This patient had at times been troubled with severe cough and expectoration; never raised blood, but was subject to paroxysms of coughing upon rising in the morning.

Immediately after recovery and examination inhaled again to anæsthesia; auscultation and percussion gave same result as stated.

CASE VI.—Female, æt. 40, plump, well nourished, ruddy complexion, healthy looking, married. To my surprise found prolonged expiratory murmur under left scapula, vocal resonance and dullness at posterior apex and above scapula. Patient said "that lung is weak, and sometimes have had pain in it." Liable to colds and cough: never raised blood, but once had a long cough with free expectoration; under clavicle on left side found prolonged expiration and general puerility of character of respiratory murmur.

Patient inhaled quietly and rapidly; lost consciousness without struggling: lividity slight and anæsthesia brief, but at the instant of unconsciousness my ear, being under left scapula near its superior portion, heard distinct metallic tinkle; a snapping at short intervals as of a wet guitar string; and rhonchus speedily followed by moist crepitation and pectoriloquy.

Examination after recovery, (several times within five minutes:) Crepitation coarser, but still well marked; transmission of voice sounds probably from stagnating circulation through vesicular capillaries and occlusion of air cells, but suggestive of dilatation of bronchi and pressure of air vesicles toward the thoracic walls, slowly disappearing, however.

No bad effects experienced beyond an attack of hysterical crying.

CASE VII.—Lady, æt. 33, frail looking, with hectic flush on each cheek; has had short hard cough for several months on rising in the morning; occasional pain through the right shoulder and heavy feeling on the chest in front; had also hæmoptysis somewhat profuse one year ago, was then in apparent health; has since had uterine troubles; emaciation not marked; is better now than for months; had once tried to inhale nitrous oxide from a rubber bag, and under unfavorable circumstances, "was almost suffocated, not put to sleep;" has recently been examined by a physician of some prominence in town, and pronounced (party says) sound.

Examination before inhalation: Vocal resonance and dullness behind left scapula with prolonged expiratory murmur; the right lung, the supposed seat of former hemorrhage (since a burning sensation in that lung had resulted,) considerably diseased; unable to decide without more critical examination whether there was cavity, but suspected it from hoarseness of bronchial note and voice sounds; pulse rapid and quick, (95;) under careful administration of gas the pulse rapidly assumed an hemorrhagic feeling; patient gasped and paled to an alarming degree; ear at lung detected sounds detailed in previous cases in lower left lobe, the upper giving simply exaggerated voice and breath sounds; the right lung at point of chief disease (apex) gave coarse crepitation and rhonchus, then scarcely any respiratory sound whatever. This fact, in connection with pulse and aspect of patient, decided us to abstain from giving more gas. Anæsthesia incomplete. Patient upon recovery was exceedingly alarmed, faint and gasping, clutching at the right and left breast alternately, and

presenting all the impression of a person laboring under hæmoptysis. No blood however came, and in about five minutes patient recovered completely and the lungs assumed the condition noted in the preliminary examination; no headache or bad feeling resulted.

CASE VIII.—Male, æt. 37, has been a soldier, lost one leg and endured considerable hardship; raised blood about once a year for several years; has had for a long time a slight cough, and eight years ago was told by a consultation of physicians that one lung was almost gone and the other full of cavities, but since then has made up his mind to live, and has been steadily improving.

Found on preliminary examination that the lungs were in tolerable condition, one sound, the other diseased at the apex (left) with apparently a small cavity, but without the sounds of active disease.

During inhalation *no marked change occurred*, yet party was fully under the influence of the anæsthetic; face and lips livid; stertorous breathing as if from chloroform; eyes open, and a strong tendency to clonic spasm. (This stertor was noticed in none of the preceding cases.) Party upon rousing up was wild and incoherent for about a minute.

Critical examination during return to consciousness enabled me to detect no change beyond a very slight exaggeration of respiratory murmur, and this not confined to the point of former disease.

Examination after recovery showed still no change; party felt well and exhibited no effects whatever of his recent anæsthesia.

CASE IX.—Female, æt. 30, medium appearance as regards health; states that she has weak lungs, and knows one lung to be seriously diseased, or at least has been told so by physicians.

Never raised blood, but has long had a short cough and aching pains about the shoulder-blades; has no strength, &c. Upon examination prior to inhalation found on posterior portion of middle lobe of right lung a circumscribed spot of perceptible dullness with roughness of murmur and evident deficiency of resilient power in pulmonary tissue; some vocal resonance also and impairment of vesicular character. Examination during inhalation over point of morbid sound showed roughness and vocal resonance exaggerated, and heart sounds clearly transmitted; after a few minutes coarse crepitation and sounds like the stretching of rubber bands; much gasping, lividity, struggling, and stertor with complete loss of consciousness. (Had tried gas before in St. Louis, and dentist had been obliged to desist.)

Upon recovering was unconscious of having struggled, and in a few minutes felt perfectly well, with no headache or other ill feeling. After ten minutes the condition noted in preliminary examination was restored.

CASE X.—Female, married, æt. 36, delicate in appearance, and thinks both lungs diseased; has had cough over a year, and hectic fever within six months, but of short duration. Has been gaining flesh and strength under cod-liver oil and wine; able to be constantly about; never raised blood.

Examination before inhalation: Disease of one lung at apex and of considerable extent with small cavity; no circumscribing dullness or consolidation in vicinity of the cavity; no evidence in short of progressive deposit or new breaking up of tissue.

Inhalation gave sense of great relief and lightness in the chest.

Examination during inhalation: Rapid enlargement of area of dullness; coarse crepitant rales and speedy disappearance of vesicular murmur throughout diseased lung.

Sound lung affected in a peculiar manner; apex, which had before appeared healthy, presented all the evidences of incipient phthisis, the remaining portion of the lung being affected in the manner indicated as common to healthy lungs.

After return of consciousness the sound* lung speedily cleared itself of morbid sounds; the other much more slowly.

The above cases given in detail would be left without comment but for the fact that as they are copied almost verbatim from notes made at the time of observation, their important features are not made prominent. The observations of which the cases are designed to be illustrative indicate to my mind, although they by no means prove the following facts, and from them it is easy to deduce an answer to the question proposed to be answered at the beginning of this article.

1st. Inhalation of nitrous oxide is in *some degree* likely to prove injurious in cases of phthisis.

2d. That inasmuch as pulmonary congestion is almost a necessity to anæsthesia by this agent, and is concomitant with a well-marked tendency to increase of hemorrhage from any cut or abraded surface, its inhalation is somewhat hazardous in cases where hæmoptysis has occurred, or where there exists an hemorrhagic diathesis.†

3d. That the sense of relief frequently experienced by those having diseased lungs is alluring simply, and does not indicate benefit, and believing it to be due to an annulling of the hyperæsthesia of the bronchial nerves, the inference follows that the agent may prove curative, or at least palliative, in asthma and in affections accompanied by bronchial spasm.

Supplementary Case II. is referred to as an example of its effect.

The two cases following are appended as of interest.

Supplementary Cases.—I. Female, æt. 62, feeble, supposed to have heart disease, complexion pallid, pulse irregular, subject to "faint spells;" preliminary examination showed no evidence of disease of heart; irregularity of pulse, probably due to nervous excitement.

Respiratory murmurs markedly puerile.

Under anæsthesia pulse became regular, then gradually imperceptible; face livid and peculiarly corpse-like; puerile character of respiration gradually gave place to soft vesicular murmur and normal condition found in sound adult lungs; evident erotic excitement, with motions as of sexual intercourse just prior to and following complete anæsthesia.

II. Boy, æt. 12, with the contracted chest, distended superficial veins, and peculiar look of an asthmatic.

Preliminary examination showed quite extensive emphysema of right

* During the ensuing four weeks this case was repeatedly examined; several inhalations were indulged in for the pleasurable relief obtained, the demand growing more urgent and at shorter intervals; pulse, always somewhat accelerated, gradually maintained a persistent celerity that demanded a discontinuance of the practice. Contrary to advice, she continued (secretly) inhalations elsewhere under assurance of an empiric that she would thereby become permanently cured. After two weeks of rapid failing was found having hectic fever and exhibiting advancing disease in both lungs; pulse constantly above 100, and emaciation very rapid.

† I have been credibly informed of cases where hæmoptysis has occurred in the dentist's chair, and have known of others following the inhalation of the gas.

lung with bronchitis of both, of chronic character and eccentric hypertrophy of the heart (right ventricle dilated;) apex beat two and one-half inches from proper place toward median line; area of dullness hard to define, owing to contiguous dullness of lower left thorax, but estimated at three and one-fourth in transverse, and four and three-fourths in vertico-oblique diameter, or about the size of the heart of an adult; pulse irregular; wheezing and tracheal rattle particularly well marked; has frequently raised mucus streaked with blood; had attacks of asthma since the age of five years. Examination during inhalation, which was not pushed to anæsthesia, showed gradual freedom of respiration, and was accompanied by a sense of great relief. After two minutes the air penetrated freely without wheeze or rattle to every part of both lungs; a portion of left lung, where vocal resonance had been noticed before inhalation, assumed healthy sounds, and resonance disappeared.

Examination ten minutes after recovery showed still comparatively healthy sounds throughout the lungs.

The night following this exhibition of the gas the patient had *no attack* of dyspnœa; no wheeze or rattle, and felt great relief in breathing, the first time in several weeks; he was, moreover, able to lie down in bed, for the first time in an equally long period. The next day examination prior to inhalation showed greater area of true vesicular murmur, and certainly what appeared marked improvement in general respiratory condition.

Examination during inhalation showed a gradual clearing out as it were of air tubes with marked vesicular improvement, passing gradually into a condition similar to what has been described, viz, of evident congestion and occlusion of air cells; well pronounced bronchial breathing, and at apex of left lung clearly transmitted heart sounds. After inhalation, which had been continued twelve minutes, patient spoke of the same sense of relief even while there remained still considerable occlusion of air cells.

The transmission of heart sounds, which singularly had occurred at seat of greatest emphysema, gradually ceased. Pulse and heart's action assumed a steady regularity during inhalation, and became again irregular upon recovery.*

Daily inhalations of about fifteen minutes were indulged in, but in no instance to complete anæsthesia, and from the date of the third inhalation no attack recurred for a month, and patient, who meanwhile had been using no other medication, was instructed to return home, and upon the first suspicion of threatened dyspnœa to resort to nitrous oxide; accordingly, February 18, he presented himself, saying he had felt "wheezy and found his breath somewhat shortened."

Daily inhalations as before, but for four days only: removed every vestige of trouble, and an examination of the heart gave the following remarkable result: area of dullness diminished laterally one-half inch; longitudinally three-fourths of an inch; apex beat one and one-fourth inches from its normal place.

Several weeks of immunity from all unpleasant symptoms have elapsed at the date of writing, and while one case proves nothing, however corroborative it may seem of a preconceived theory, the suggestion afforded by the remarkable relief obtained may be of service to some sufferer similarly situated.—*American Journal of the Medical Sciences, July*, 1870.

* This feature, already before noted, occurred in many instances, and is suggestive of possible benefit to be derived also by sufferers from cardiac neurosis.

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PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The Fifteenth Annual Session, 1870-'71.

PRELIMINARY LECTURES AND INSTRUCTIONS.—The Dispensary and Labora tory of the College will be opened on the 1st of September, where ample opportunities will be afforded the student, until the close of the session, for the prosecution of the practical p·rt of the profession, under the guidance and supervision of Demonstrators of known integrity and capability; and during October Preliminary Lectures will be delivered. In this month, as well as through the entire session, a clinical lecture will be given, and operations performed by one of the Professors every Saturday afternoon.

THE REGULAR SESSION

Will commence on the first Monday in November, and continue until the first of March ensuing. The course is so arranged that about eighteen lectures will be delivered each week on the various branches taught in the College. A synopsis of which is given below:

CHEMISTRY.

The Course of Instruction from this Chair will commence with the considerations of the forces that act upon matter, and the laws which govern those forces Chemical nomenclature, the individual elements, and the compounds resulting from their combination, will then be considered. The course will be illustrated by diagrams and such experiments as can be performed before the class.

MECHANICAL DENTISTRY AND METALLURGY.

The instructions from this chair will embrace—the proper fitting up of a dental laboratory, the use of tools, refining, melting, alloying, and working of the precious metals, and the properties and combinations or alloys of the base metals used by the dentist; the description of the materials, their preparation, and the most approved formula for making porcelain teeth and blocks, together with the proper manner of compounaing them; the history and properties of all substances called into requisition in making dental substitutes; the entire range of manipulation of the different materials used as a base, from the impression to the completion, and proper adjustment of the case in the mouth, and such other information as appertains to this chair. The lectures will be amply illustrated by specimens, models and diagrams, and the practical application will be given in the Laboratory, under the supervision of an accomplished Mechanical Dentist.

DENTAL PATHOLOGY AND THERAPEUTICS.

The lectures delivered from this chair will embrace General Pathology, Dental Pathology, the Pathological Relations of the Teeth to other parts of the System, together with a minute description of all special diseases that have any relation to Dental Surgery, or of interest to the Dentist. They will also include a careful examination of therapeutic agents and their general application. Their indication in the medical and surgical treatment of diseases of the mouth, both idiopathic and symptomatic, will be fully illustrated. Special attention will be directed to the application of all the Anæsthetic Agents.

DENTAL HISTOLOGY AND OPERATIVE DENTISTRY.

The lectures of this department will embrace the comparative anatomy of the teeth, the functions and microscopical pecularities of the dental organs, the development of teeth and their component tissues. It will also include a full description of the materials and instruments used in operative dentistry, and will comprise a thorough elucidation of all the operations required of the Dental Practitioner, such as filling, extracting, regulating, &c. &c. A portion of the course will be devoted to a description of the microscope and the modes of preparing specimens. The incumbent of this chair will practically demonstrate in the clinic the theories taught.

PHYSIOLOGY AND MICROSCOPIC ANATOMY.

The lectures from this chair will include a consideration of the entire subject of human physiology and physiological chemistry, with such portions of comparative physiology as are essential to a comprehensive understanding of the subject; also, the doctrines of life and organization. They will be amply illustrated by a propriate chemical experiments and vivisections.

The minute structure of the organs involved in the organic and animal functions will be carefully described and illustrated by diagrams and the class microscope.

ANATOMY AND SURGERY.

The instruction in this department will embrace a systematic course of Lectures on Descriptive and Surgical Anatomy, fully illustrated by dissections on the *cadaver*, preparations, models, drawings, &c.

The minute anatomy of the various organs and tissues of the body will be shown by the class microscope, and particular attention will be given to the demonstration of the anatomy of the head and face.

Clinical instruction in the diagnosis and treatment of the surgical diseases of the mouth will be given once a week by the incumbent of the chair. Students will thus have the opportunity of studying oral diseases, and witnessing the operations adopted in their treatment.

CLINICAL INSTRUCTIONS.

In addition to the above, with the exception of Saturday, four hours are daily spent by the student in actual practice under the supervision of the demonstrators.

IN THE OPERATIVE DEPARTMENT.—To afford every facility to the student to acquire a thorough practical knowledge of this branch, the operating rooms are furnished with twenty-eight chairs, so arranged as to command the best light, and all the appliances for comfort and use. To these chairs the students are assigned in classes, and certain hours are fixed for each member of the class to operate. Every student is required to provide his own instruments, except those for extracting. He is expected to keep them in perfect order, and will be provided with a place in which they can be locked when not in use.

IN THE MECHANICAL DEPARTMENT.—In the Laboratory are all the conveniences for the preparation of the metals, manufacture of teeth, single and block, mounting, &c. Every process known in the profession, which has any value to the mechanical dentist, is fully taught, and receipts of valuable compounds are freely imparted; and the student is required to go through all the necessary manipulations connected with the insertion of artificial teeth—from taking the impression of the mouth to the entire construction of the denture, and its proper adjustment in the mouth of the patient. Every student is required to furnish his own bench tools, and will be provided with a drawer which he can lock.

PRACTICAL ANATOMY.—The great facilities for the study of practical anatomy to be found in Philadelphia, in several well ordered and supplied dissecting rooms, present to the student advantages for its prosecution superior to those offered in any other city.

HOSPITAL CLINICS.—In addition to the facilities afforded by the College for a thorough course of instruction in the theory and practice of dentistry, the celebrated hospitals and clinics of the city constantly enable the students to witness various important surgical operations which are highly interesting and instructive. The medical and surgical clinics of the Pennsylvania and Philadelphia Hospitals, two of the largest eleemosynary establishments in the world, are open to medical and dental students, free of charge.

FEES.

Matriculation, (paid but once,)	\$5 00
For the Course, (Demonstrator's ticket included,)	100 00
Diploma,	30 00

TEXT BOOKS AND WORKS OF REFERENCE.

Gray's, Leidy's, Wilson's, or Sharpey & Quain's Anatomy; Carpenter's or Kirke's Physiology, (English editions,); Dalton's or Flint's Physiology; Tyson's Cell Doctrine; United States Dispensatory; Pereira's, Biddle's or Stille's Therapeutics: Fownes Elements of Chemistry; Brandt & Taylor's Chemistry; Lehmann's Physiological Chemistry; Flint's Practice of Medicine; Wood's Practice; Tomes' Dental Surgery; Harris' Principles and Practice; Taft's Operative Dentistry; Richardson's Mechanical Dentistry; Wildman's Instructions in Vulcanite Work; Barker on Nitrous Oxide; Gross' or Erichsen's System of Surgery; Paget's Surgical Pathology; Hartshorne's Conspectus of the Medical Sciences, or other standard works on the same subjects.

QUALIFICATIONS FOR GRADUATION.

The candidate must be twenty-one years of age. He must have studied under a private preceptor at least two years, including his course of instruction at the College. Attendance on two full courses of lectures in this institution will be required, but satisfactory evidence of having attended one full course of lectures in any respectable dental or medical school, will be considered equivalent to the first course of lectures in this College. Also satisfactory evidence of having been in practice five years, inclusive of term of pupilage, will be considered equivalent to the first course of lectures.

The candidate for graduation must prepare a thesis upon some subject connected with the theory or practice of dentistry. He must treat thoroughly some patient requiring all the usual dental operations, and bring such patient before the Professor of Operative Dentistry. He must, also, take up at least one artificial case, and after it is completed, bring his patient before the Professor of Mechanical Dentistry. He must, also, prepare a specimen case to be deposited in the College collection. The operations must be performed, and the work in the artificial cases done at the College building. He must also undergo an examination by the Faculty, when, if found qualified, he shall be recommended to the Board of Trustees: and, if approved by them, shall receive the degree of Doctor of Dental Surgery.

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THE

DENTAL TIMES.

Vol. VIII. PHILADELPHIA, JANUARY, 1871. No. 3.

Original.

DR. S. P. CUTLER'S REPLY TO DR. ZUR NEDDEN.

In the Dental Times, for October, 1869, I notice, on page 79, the editor quoting from the July number of the *Deutsche Vierteljahrsschrift fur Zahnheilkunde*, gives a list of articles contained therein.

Under the head of synopsis of American Dental Journals, the editor says: "We observe Dr. Nedden, sharply, and *we think*, justly, criticises Dr. Cutler for his failure to give more than his mode of preparing a pulp for microscopic investigations, after he had promised to publish his mode of discovering the millions of nerve fibres." Not knowing what my criticiser over the water has said, any farther than the notice by the Times' editor, of Dr. Nedden's criticisms, stating the fact of my failure, &c., I infer from what was stated, that the Dr. referred to one of my articles only; if so, I will call his attention to various articles in the different journals for the last several years on this side of the Atlantic. I am not aware that I promised to prove my statements in relation to a large molar tooth containing millions of nerve fibres, any farther than giving the result of my researches and the formula for calculating the probable numbers which any one versed in simple arithmetic, if a microscopist, can do, if the fact be admitted that teeth do have nerves at all If that fact be denied, it is of no use for me to make any defence in the premises. I stated in one article on the subject this: Prepare a specimen from dentine at the point where it joins the enamel, so as to show the dentinal tubular openings after their coronal or peripheral bifurcations of a given size, say a half a line or less, and count the number of tubular openings in the specimen, and then simply see how many will be contained in a square inch, which, according to my imperfect calculations, will be about

nine millions or more, that is, allowing a tubuli for every five thousandths of an inch. I also stated the fact, that very large teeth contain from one-half to two inches of superficial surface after the removal of enamel and cement. The only chance for any error in my calculation rests in the distances apart of the tubuli at the precise surface of the dentine. In the calculation and statement I still maintain, without any apprehension of contradiction, as it rests on a simple arithmetical calculation only, without any hypothesis about it.

Who ever attempts this experiment may make many attempts before he succeeds in getting a satisfactory specimen; unless the specimen is taken just at the contact with the enamel, nothing like as many openings will be found to the square line. I lay my statements at the point of greatest numbers of tubuli, maintaining that each contains a nerve filament in a live tooth. If my foreign critic denies or ignores the existence of nerves in the tubuli, and adopts the hydrated theory of Koliker and others, I have no arguments to offer him on the subject, only to ask him if he believes in the sensibility of water, or the power of water to convey sentient or sensorial impressions through the dentinal structures. I am well aware that the statement I made in relation to a tooth containing millions of nerves was met by the profession with no small amount of incredulity. This I expected and anticipated before making the statement. Just under the enamel, in contact with it, the tubuli are nearly double as numerous as they are just a little farther in, as such and every tubuli forks or bifurcates one or more times just before entering the inter-enamel membrane. So far as the crown of the tooth is concerned, I have never seen an exception to this bifurcatory system in the fangs. There may be possibly some exceptions, though I am not certain of the fact.

I have before stated, in former papers on the subject, that all tubes passing from the crowns, with all their branches, invariably terminate at the enamel, none falling short or terminating in the inter-tubular regions; not always so, however, with the tubuli arising in the fangs.

Now, in order to determine whether or not my statements be correct in relation to millions of nerve fibrils in the dentine of a tooth, let any competent microscopist prepare specimens of dentine as above directed, and when a suitable one is found, with the tubular openings passing through the specimen, then apply the micrometer and measure the distances between the tubular openings, and if they are found to be one five-thousandth of an inch apart and the surface of the dentine of a tooth, with one superficial inch, will clearly prove my former statements, which have been so severely criticised by my friend over the water.

Should the tubuli be found to be a greater distance apart, my calculation will fall short in proportion to the increased distance. In case the distance should be found to be double, my calculation will fall short a little over two-thirds, which would give only about *three millions* (3,000,000) for a molar, with only one superficial inch; though some large molars, about double that, which would give me about six millions instead of eighteen millions. Let my critical friend follow out my directions, and he will find my former statements nearly correct, not taking into calculation the very minute feathery branchings in the fangs of many teeth, which themselves might be numbered by hundreds of thousands, which still further sustains me in my former statements.

My present method of preparing soft pulps, so as to demonstrate the fact long ago stated by myself, that the nerve fibrils were traceable through the pulp membrane into the dentinal tubuli, is as follows:—

"Extract a cuspid, bicuspid or incisor with a living pulp, then put the tooth into alcohol and let it remain for twenty-four hours or more, then put the tooth into a solution of chromic acid, sufficiently strong to give it a deep color, and let it remain for several days, then remove the tooth and file or rasp it down near the pulp cavity on one side, or on all sides if desirable, then crush the tooth in a vice or forceps just enough to be able to separate the broken parts, and remove the nerve pulp and press it between two thick pieces of glass, so as to flatten it sufficient to render it transparent, then mount in balsam pitch as usual and it is ready for use. Another method of mounting is, to slice it into thin sections with a razor, and mount as above directed. Prepared in this manner, the nerve fibrils are seen with the greatest beauty and clearness; the fibres withdrawn from the dentine in the region where the tooth had been dressed down, may be distinctly seen projecting through the pulp membrane, laying flat on the membrane as a general thing. Where the pulp is pressed and flattened down between glasses, these fibrils may be chiefly withdrawn through the membrane, leaving the fibrilar openings clear and distinct; where they are thinly sliced the fibrils will all be seen *in situ*.

Pulps prepared in this way remain full, plump and firm, as all the elements are hardened and fixed, no evaporation and shrinkage, and in addition bringing out the nerval structure with the greatest facility. This is somewhat different from that recommended by Frans Bouel.

This experiment clearly demonstrates the fact that the nerve fibrils are projected from the soft pulp into the tubuli, which has been a mooted question so long, and shows the continuation of the pulp fibrils without any break into the tubuli.

HOLLY SPRINGS, MISS.

TO REDUCE GOLD AND SILVER SCRAPS AND FILINGS TO PLATE.

BY T. L. BUCKINGHAM, D. D. S.

Now, when rubber work has nearly run its course, as I hope it has, and patients are beginning to demand better materials, it may not be out of the way to say a few words in regard to reducing gold and silver scraps and filings to plate, so that they can be worked up. This information is required more by the younger members of our profession than by those older, as many of them have come into the profession since rubber-work was introduced, and have seen little or no metal work done; in fact, we have occasionally students who have been in practice four or five years, and have never done a piece of metal work. Hence we have adopted a rule at our college requiring each student to make a piece of metal work before he can graduate. I think the profession at large will agree with me in saying, that continuous gum, gold, or even silver work, is much better than this cheap rubber work, that is so generally used. It does one good to see, as we do occasionally, a piece of gold work that has been worn ten or fifteen years, and looks nearly as well as it did when made. There is about the same comparison between it and this cheap rubber work that there is between a good gold and an amalgam filling.

As we cannot afford to throw away the gold and silver scraps and filings as we do those of rubber, it is well to know some process to reduce them to plate. The process I have adopted, and, if tried by others, I think will be found very good, I will not say the best, for the same results may be arrived at by other processes, is to first keep the scraps and filings as clean as possible, for, with the greatest care, a large amount of foreign matter will get in. We have constantly to use zinc and lead for our casts, tin sometimes for patterns, and the wearing of the files adds iron or steel; these, with the plaster and other foreign substances that will get in, make quite a conglomerate mass. The first thing I do with my gold scraps and filings is to pick out all the large pieces of gold with a pair of pliers, removing all the large pieces of the other baser metal. Then sieve the small scraps and filings through a sieve, which I have made out of a tin blacking-box lid by punching it full of holes with a plate punch as far in as I could reach, and then making holes in the centre with a small punch and hammer. It may be possible to buy small sieves, but I have not seen them for sale at any of the depots. This separates the filings and very small pieces from the scraps. The scraps are now spread out on a piece of clean paper, and all the pieces of base metals are picked out with a pair of pliers. Through the filings is first passed a magnet, which removes all the iron and steel; they are then put into an evaporating dish or Florence flask, and some dilute nitric acid poured on them. This dissolves the silver and baser metals, except the tin, which is oxidized,

and remains with the gold filings. When the acid ceases acting it is poured off and kept, to obtain the silver which it contains. The filings should be washed several times with fresh water and then dried, when they are ready for melting. The larger pieces of scraps and parts of old plates that contain no solder, and are firm enough to make plates out of again, should be melted together with a little borax in a clean crucible. The filings and scraps that contain solder and stays, with platina pins in them, should be melted together, and when in a melted state a few pieces of saltpetre (nitrate of potassa) should be thrown into the crucible. Nitrate of potassa is decomposed, the oxygen oxidizes the baser metals that are present, and they are absorbed by the crucible or float on the surface with melted borax. The most of the oxide of tin, if any is present, melts, and is absorbed by the crucible, but it is exceedingly difficult to get rid of all the tin in this way; it is one of the hardest metals to separate from gold that we have, and there will be nearly always a small portion remaining, but as it adds to the elasticity and hardness of the gold the small quantity that is left does little harm. We cannot be certain of the quality of gold refined in this way—it may be more or less than eighteen karat fine; the platina and tin changes the color very much, and also gives it hardness and elasticity, so that this gold should only be used for making clasps and stays for the teeth; for which purpose it answers better than the gold plates alloyed from the coin.

To reduce silver scraps and filings, we proceed in the same manner that we do with gold, separating the larger pieces that will do to melt without being refined and melting them with a little borax, or if they contain solder, and it is necessary to refine them, throwing into the crucible a little saltpetre until they are melted. By using a sufficient quantity of saltpetre, they may be made nearly pure silver. The scraps which contain solder and the filings, after being sieved and having a magnet passed through them to remove the iron, should be put into an evaporating dish or Florence flask, and have dilute nitric acid poured on them; this, with a gentle heat, will dissolve the silver. The acid should be added until it ceases acting, which may be known by no more red fumes coming over when fresh acid is added. This operation should be performed in a chimney place, or where there is a draft of air to carry the fumes out of the laboratory, as they are poisonous to inhale, and oxidize the instruments when they come in contact with them. The residue that is left in the flask, after the acid containing the silver is poured off, usually has enough of gold filings mixed with it to pay for the trouble of refining the silver. It is singular with what tenacity gold will stick to nearly everything it comes in contact with, except a man's pocket book, and there it almost appears to undergo a spontaneous evaporation.

The next part of the process is to obtain the silver from the solution. This may be done in several ways. If a piece of copper plate be suspended in the fluid that contains the silver, the nitric acid wlll leave the silver and combine with the copper. The silver will fall down in a dark, grayish, crystalline mass, and only requires to be dried and melted with a little borax, or the solution may be diluted with twice its bulk of water or more, and a solution of common salt (chloride of sodium) poured into it, taking care not to pour too much in at one time. A white curdy precipitate forms, which soon falls to the bottom of the vessel. When no more of this precipitate is formed when fresh additions of the solution salt is added, it may be allowed to settle, and the fluid poured off and thrown away, as it contains nothing worth saving. The chloride of silver should now be washed by pouring over it some fresh water, and stirring it up; when it has settled, pour the water off; by repeating this operation several times, the chloride may be washed perfectly clean.

The next part of the operation is to reduce the chloride of silver. The chloride should be covered with fresh water, and add a small portion of sulphuric acid; then put a few small pieces of zinc in the vessel, and let it stand for a day. The chlorine will leave the silver and combine with the zinc. When all the chloride has been reduced, it is better to use an excess of zinc and sulphuric acid, to ascertain that the chloride is all reduced. The zinc, if any remains, should be removed, and fresh sulphuric acid added, so as to dissolve any zinc that might remain. As much of the fluid is now to be poured off as can be, without losing the silver, fresh water poured on, and this is to be repeated until the water comes off tasteless. The silver will be in a dark grayish powder, much finer than when it is precipitated with copper, and only requires to be melted and rolled to be brought into plates. There are other processes of reducing the chloride of silver, but the above are the simplest and least expensive.

Pure silver is always useful in the laboratory. We use it for making solder; two parts silver and one of fine brass makes the best silver solder. The silver should be melted first, with a little borax, and, while melted, the brass dropped in. If they are both melted together a portion of the brass will be burnt out, and the solder will not be so good.

Gold alloyed to the required karat with silver solder makes the best gold solder. Pure silver is too soft to make plates, but it can be used for rimming above the teeth, as it can be bent more easily than coin. Silver alloyed with platina makes a stiff plate, and is preferable to coin as it contains no copper.

Silver wire dipped in nitric acid forms nitrate of silver on the surface of the wire, and the caustic may be applied in this way to the gums, or to the pulp of a tooth, or into an alveolar abscess, more easily than it can from a solid stick of caustic.

ODDS AND ENDS.

NO. II.

BY E. WILDMAN, M. D., D. D. S.

In continuing this medley, I shall first give some formulæ for making spirit varnishes, as most of the formulæ given in the books for making these are quite complicated, and for our purpose not so good as the following simple ones, which are readily compounded:

SPIRIT VARNISHES.

No. 1.—*Sandarach Varnish.*

Gum Sandarach, 5 oz., (avoir.)
Alcohol (above 60 pr. ct.,) 1 pint.

Place these in a bottle and cork tightly to prevent the evaporation of the alcohol; shake up the contents frequently, in the course of two or three days, at the ordinary temperature of the room, the gum will be completely dissolved, when the varnish will be made and ready for use. The solution of the gum may be hastened by placing the bottle containing the mixture in warm water, or near the fire, but it is not advisable to do so, as the heat causes the alcohol to volatilize, and should this vapor when mixed with atmospheric air come in contact with flame, an explosion would be the result. In case heat is used, place the bottle in a vessel of warm water, keeping it distant from any flame. In making this varnish, or according to either of the formula given below, strong alcohol should be used; I prefer the 95 per cent. If the gum sandarach is carefully picked, so as to free that used from all foreign matter and discolored pieces, before mixing with the alcohol, this formula will give a beautiful, colorless, transparent varnish.

Spirit varnishes should be tightly corked when set away, to prevent their becoming thick by the loss of the alcohol by evaporation. Should they at any time become too thick for use, this is easily remedied by the addition of some alcohol.

No. 2.—*Shellac Varnish.*

Gum Shellac, 5 oz., (avoir.)
Alcohol (above 60 pr. ct.,) 1 pint.

In compounding this proceed as directed for making No. 1. This gives a brown varnish harder than No. 1, but not so sightly for coating models.

I give the preference to No. 1, or Sandarach varnish, for varnishing models, for the reason it does not discolor the plaster, it dries quicker, is more penetrating, and is sufficiently hard for all practical purposes. In using No. 1, where it is desirable to have it still more penetrating, dilute it with alcohol and apply several coats; it will then penetrate deeper into the plaster, and consequently, when dry, give a surface better able to resist any pressure or impact that may be brought to bear upon it. The object

in varnishing a model is to prevent the plaster from soiling the hands in handling it, to give a harder surface and to fill up the interstices between the particles of the plaster on its surface, so as to prevent the sand in moulding from adhering to it. The model should be dry, so as to allow the varnish to penetrate into the plaster, as, without this precaution, the gum is precipitated and forms a scale upon the surface by the union of the water and alcohol, which is not what is desired to be accomplished, neither should the varnish be so thick that it will not penetrate, nor so many coats of it applied when thin as to rise above the surface of the plaster and give it a polish like a piece of furniture.

No 3.—*White Shellac Varnish.*

Bleached Shellac, 5 oz., (avoir.)
Alcohol, 1 pint.

This treated as before directed gives a nearly colorless varnish. The bleached shellac is not so soluble in alcohol as the brown, nor does it produce so homogeneous a solution. Some writer states, by first digesting the bleached shellac in ether, prior to its mixture with alcohol, a perfect solution is obtained.

No. 4.—*Brown Spirit Varnish.*

Gum Sandarach, 3 oz., (avoir.)
Gum Shellac, 2 oz., (avoir.)
Alcohol, 1 pint.

Mix as directed for making No. 1. This gives a light brown varnish, with properties intermediate between the Sandarach, No. 1, and Shellac, No. 2.

Colored Varnishes.—When it is desirable to have a colored spirit varnish, it can be readily made by using either of the above formula as a base, and incorporating with it a sufficient quantity of the proper coloring matter to produce the required shade. When a dark shade is wanted, I prefer No. 2, or shellac varnish, as a base, but where a very light shade or a white is desired, a colorless base must be used. The coloring matter must be levigated very fine before it is introduced, and the varnish should be perfectly clear, or free from all foreign matter, to produce a good result. For making these different colors, the following may be used with good effect: For red, vermilion; for green, chrome green; yellow, chrome yellow, or for transparent yellow, gamboge; white, white oxide of zinc; for black, lamp-black, or better, a fine quality of ivory black; for blue, Prussian blue, &c.

No. 5.—*Crystal, or Balsam Varnish.*

For maps, drawings, and to give water-colored prints the resemblance of paintings in oil.

Canada balsam, 1 oz.
Spirits of turpentine, 2 oz.

Mix together. Before applying this varnish to a drawing or colored print, the paper should be placed on a stretcher and sized with a thin solution of isinglass in water and dried. Apply with a soft camel's hair brush.

This varnish is useful in preparing microscopic objects prior to mounting them in Canada balsam.

Carmine Ink.—A good red ink that is durable is often desirable, and cannot always be procured at the shops, either of the following formula can be relied upon. The first is extracted from the *Chemical News*, the second a modification of it.

No. 1.—Pure Carmine, 20 grs.
Aq. Ammonia, 3 f. oz.
Pulv. Gum Arabic, 18 grs.

Pulverize the carmine in a mortar, then add the aq. ammonia and stir until it is all dissolved, then add the gum arabic; when this is dissolved, the ink is ready for use; keep in a closely stopped bottle. Should it at any time become thick add a few drops of aq. ammonia.

No. 2.—Pure Carmine, 24 grs.
Aq. Ammonia, 2 f. oz.
Water, 2 f. oz.
Pulv. Gum Arabic, 24 grs.

Dissolve the gum arabic in the water, dissolve the carmine in aq. ammonia as above directed, then mix the two solutions together and the ink is made. To produce a good article the carmine must be pure and of the best quality. When very strong aq. ammonia is used, I prefer mixing according to formula No. 2.

Gummed Wheels are often a great annoyance to the operator in the laboratory. This may arise from either there being too much gum in proportion to the corundum in the composition of wheel, not keeping it sufficiently wet during grinding, or by oil or wax getting on the cutting face.

To restore the wheel to its former condition, immerse it in a very strong solution of caustic potash or soda, and allow it to remain five or ten minutes, then remove it with a pair of tweezers, wash well in water, at the same time brush the surface with a stiff brush. This treatment, if properly applied, will restore the wheel to its normal condition.

Concentrated Lye.—In the laboratory I find *concentrated lye* frequently useful where a strong alkaline solution is required. The manner in which I prepare it is, to take a box of *concentrated lye*, as sold by druggists and grocers, and dissolve it in about two quarts of water; allow the solution to stand until clear, then bottle and keep for use. If kept well corked, so as to prevent the admission of the air, it will keep unimpaired for any length of time. In using or handling be careful not to allow it to get upon the hands, as it is very caustic.

This solution is of the proper strength with which to treat gummed wheels.

DENTAL SUGGESTIONS.

BY J. D. WINGATE, D. D. S.

Plaster of Paris absorbs moisture very readily, and must be kept in a very dry place, and well secured from the air.

When in barrels a year, and even well covered, it will acquire an objectionable rottenness, but will set more quickly than new plaster; on that account it becomes better for taking impressions. In using plaster that is impaired, the blocks of teeth, no matter how well ground on, will open, and show unsightly joints. Even the casts may give, so as to cause a bad fit.

The spreading of the teeth may often be remedied, by bending to fit pretty close around the teeth a strip of tin plate three inches long and half an inch wide. After the cast is imbedded in the lower part of the flask, the tin can be set close up to the teeth, before pouring, to imbed them.

Lately I made a number of experiments on the expansion, density and tenacity of plaster, expecting to develop some new ideas. Excepting the dispelling of the bug-bear, expansion, the experiments did not develop much that is of practical advantage.

I had three pieces of tin plate, six inches long by one-and-a-half inch wide, bent up at the sides, forming a trough, closed at the ends with pieces of glass propped against them. In these, bars of plaster could be run half-an-inch square and six inches long. The sides of the moulds being smooth and parallel, the expansion would soon show distinctly; but very little was visible. These experiments are simple and easy. A number of bars were run. Plaster mixed to the thickness of cream was not as strong, nor as dense, as the thicker mixtures. It seems that the less water used in making the batter the denser the cast. Sulphate of potassa and salt each contribute to hasten setting, but weaken the cast. A bar one inch square will, if run as thick as possible, sustain a weight of two hundred and fifty pounds, if suspended in a careful manner.

CATCHES IN BLOCKS OF TEETH WHEN THE RIVETS ARE GONE.

It sometimes happens that the rivets of artificial teeth are defective, or have to be ground out, so as to set the crowns low enough. A wheel made of sheet copper, say daguerreotype plate, mounted on a lathe, covered with fine emory powder and oil, will cut porcelain or glass. With this, attachments as strong as rivets may be made for vulcanizing. For convenience, I use a small tin box, in which I keep the wheel. In the lid is a slit large enough for the wheel to revolve in. A box without lid, and shallow, is soldered inside of the lid in which the oil and emery is

kept, and revolving the wheel in the latter box through the slit will cover it with the emery and oil preparatory to using. Metal plates are coming in use again.

It is important to have good solder. The best gold solder I ever used is made of eleven parts gold plate and one part zinc. Melt the gold and add the zinc; remelting the ingot makes it tougher. This, when rolled into plate, has almost the purity of the regular plate, and is soft and pliable. In soldering it flows beautifully. The proportion may vary—fifteen parts gold to one of zinc makes a good rivet solder. The zinc gold solders had the reputation of "eating" into the plate while flowing. This can only take place when too much zinc is used. Then the solder flows before the plate is heated sufficiently to incorporate the surface with the solder.

BELLEFONTE, PA.

ON THE USE OF HYPO-SULPHITE OF SODA.

BY DR. JAMES LEWIS.

I noticed in the TIMES a correspondent had trouble with a dead tooth that had remained plugged for years in the mouth of a patient, without any unpleasant symptoms until the pulp cavity had been exposed to the air. The same cause produced disturbance in this case, as has lately been found to be the leading cause of serious disturbance on exposing visceral cavities to the air—viz: the propagation of *vitiriones* (microscopic organic bodies) from germs that are ever present in the atmosphere. Such difficulties are sometimes serious and involve great suffering, and not unfrequently loss of life, where visceral cavities are thus affected. Teeth thus affected, if taken seasonably, before disease has been propagated to the investing membranes of the tooth and the surrounding osseous tissues, yield readily to carbolic acid. Hypo-sulphite of soda, it seems to me, might be used with advantage in some cases where the disease has made some progress. The most serious objection to the hypo-sulphite of soda is its intensely bitter taste. I venture to suggest this remedy to the profession, for reasons based upon its theoretical value in the prophylactic treatment of certain diseases that are supposed to originate from lacteria and other infusorial forms of life. I would recommend ten grains hypo-sulphite soda in one ounce of water, to be used as an injection, to wash out the pulp cavity once or twice daily while under treatment, keeping the pulp cavity plugged in the intervals with cotton saturated with either carbolic acid or creosote, covering with wax. This treatment will not necessarily interfere with any topical treatment it may be necessary to apply to bring about a rapid resolution of the disease.

MOHAWK, N. Y.

We have, at the suggestion of Dr. Lewis, used this preparation, and have met with unprecedented success from its application. One case was of special interest, and we detail it. Mr. A. had a dead pulp in right superior central, opened into the cavity from lingual surface. Cleaned out the decomposing matter, washed with mild solution of carbolic acid. He returned in a day or two with periosteal inflammation, which was successfully treated, and the tooth and pulp cavity temporarily filled with cotton. The gentleman was suddenly called to Europe, and he was instructed to keep the pulp cavity filled with cotton, and on no account to leave the tooth cavity open, which instruction was disregarded. The tooth was left open six months, and he again came into my hands. The tooth was in such a condition that in *five minutes* after the external cavity was closed the tooth would ache violently. All treatment failed with it, when Dr. Lewis's article came to hand, was used as directed, and from the second application had no difficulty whatever. I look upon this article as a most valuable contribution to dental materia medica.

G. T. B.

DODGES.

BY J. L.

Almost every dentist will, in the course of time, find some little expedients which serve either to abridge, simplify or insure results. A few of such have occurred to the writer, and are now about to be presented to the profession.

In the investment of teeth, either for rubber or cheoplastic base, it is desirable to have the wax entirely removed from the surfaces of the teeth, and from around and among the pins. Suppose a set of teeth set up with wax in the usual way, and just ready to go into the flask. Detach one of the front sections, remove all adhering wax as far as practicable, then drop the section in a dish of boiling soda solution. This saponifies and dissolves any traces of wax that are left. To insure perfect cleansing, take out the section from the soda, scrub it a little with a tooth brush, then wet it again in the soda, having it moist; replace it on the model with fresh wax. Repeat this process with each section of the set. The model and teeth are now ready to go into the flask. On separating the flask, the wax will pull off from the teeth and pins readily, and any bits of wax tangled in the pins can be readily picked out with a fine excavator, no wax adhering to teeth or pins.

To provide for the escape of surplus rubber. The usual mode is to cut V-shaped channels radiating from the mould. The ridges between these channels generally afford a point of resistance for a thin film of rubber that prevents perfect closure of the flask. Instead of V-shaped channels,

cut away the plaster *against the flask* an eighth of an inch deep *all around the mould;* carry the cutting back from the flask to the margin of the mould, at which point it should not exceed, say one-thirtieth of an inch. Perhaps half that would answer. There is now a free channel of the thickness of the film of rubber mentioned above, all around the mould, and the flask will close perfectly, and every part of the mould will be filled if there is the least surplus rubber.

To facilitate the pouring of metal in cheoplastic work, make a slightly tapering funnel of paper, and insert that in the pouring orifice of the flask. It will increase the "head" of the flowing metal and insure its penetration into minute crevices. Pour rapidly.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

SURGICAL CLINIC OF PROFESSOR MEARS.

[Reported by THOMAS LINN.]

A Surgical Clinic, held each Wednesday, at 10½ o'clock, A. M., has been inaugurated in this Institution, under the direction of J. Ewing Mears, M. D., recently elected to the chair of Anatomy and Surgery.

As stated in the Annual Announcement of the College, it is the intention of the Faculty to make this a prominent and instructive feature in the course, and, it is hoped, that the graduates and friends of the college, residing in the city, or elsewhere, will direct to the clinic such surgical cases as may come under their observation. The services of Prof. Mears are rendered *gratuitously*, and patients of the clinic, upon whom operations are performed, will receive careful after-treatment at their homes.

Surgical diseases of the oral cavity, injuries and diseases of the jaws, including those of the antrum, will receive treatment by operation, or otherwise.

November 9th, 1870.

In opening the clinic, Prof. Mears stated that he would deliver a course of lectures on the injuries and diseases of the jaws, illustrating them by such cases as might be presented, or by such morbid specimens as could be obtained. With this instruction, the class would be enabled to study more satisfactorily the cases, and appreciate more fully the treatment adopted. He spoke at some length of the method to be employed in the examination of patients, in order to arrive at a correct diagnosis; the personal and family history should be carefully and minutely inquired into; these have an important bearing in determining the nature of the

diseases. Under the personal history, appertain interrogations relating to the name, age, nativity, occupation, habits, social condition, and past and present condition of the patient. It is well-known that certain forms of disease are hereditary in their nature, and hence an investigation into the family history is essential.

In the study of cases, it is important to ascertain the cause. This is frequently difficult to obtain, but questions should be directed to the point, with a view to obtain as much information as possible.

The symptoms manifested during the progress of the disease are to be carefully studied, and finally, the character of the treatment proper to be adopted claims most careful consideration. He urged the class to cultivate a habit of careful inquiry in the examination of cases, in order to avoid error in diagnosis.

Through the kindness of his friend, the distinguished surgeon, Dr. Washington L. Atlee, Prof. Mears had the opportunity of presenting to the class, for their examination, a tumour of the left superior maxilla, removed by that gentleman from a patient in the month of June.

"The patient, aged 53, native of England, by occupation a cattle-drover, has always led an active out-door life, and enjoyed the best health. Two months and a half since, on his return from a visit to the far west, during which he was exposed to many hardships, he experienced pain in the left temporal region, extending down to the upper jaw, and felt most distinctly over the *site of the antrum*. The pain was severe and lancinating, and was thought to be due to neuralgia. Subsequently, the three molar teeth were extracted, under the belief that the pain was due to some disease of the nerves connected with these teeth. Soon after the extraction of the teeth, he felt a tumour projecting into his mouth; this tumour increased in size very rapidly, encroaching upon the cavity of the orbit of the eye to such an extent as to produce very marked exophthalmia. The rapidity of growth of the tumour clearly indicates its malignant character. It possesses the gross appearances of infiltrated medullary carcinoma, or encephaloid cancer. A microscopic examination confirmed this opinion, sections of the tissue presenting very numerous cells of rounded shape, varying greatly in size, and containing one, two, and even four comparatively large nuclei. The cell contents were markedly granular, and, in some instances, mixed with fatty granules."

In commenting upon this specimen, Prof. Mears spoke of the varieties of tumours which invade the superior maxilla. In general terms, tumours, no matter where located, are divided into two classes—benign and malignant.

Benign tumours are characterized by slow growth, absence of pain, firmness of texture, non-interference with surrounding tissues, and, as a

rule, they exhibit no tendency to ulceration. They are termed homologous growths, by reason of the fact that they are but abnormal developments of the normal structures of a part.

Under this head may be enumerated adipose, fibrous, fibro-cellular, recurrent fibroid, vascular, myeloid, cartilaginous and osseous tumours. Malignant tumours are marked by rapidity of growth, and are accompanied by great pain of a lancinating character; they possess a disposition to ulcerate or fungate, and invade surrounding structures, converting the normal into abnormal tissue with great rapidity Belonging to this class are the varieties of scirrhus, encephaloid or medullary, epithelioma, colloid and melanosis.

Referring to the specimen, he said that it presented all the features of a malignant tumour, in rapidity of growth, severe, lancinating pain, and ulceration. He called attention to the point, that the pain was felt most distinctly over the region of the antrum, which was, in truth, the seat of the disease. Commencing in the lining membrane of the antrum, it had attacked, in succession, the adjacent parts, destroying them as it advanced, and converting the whole into a morbid mass. Of the entire bone, there was left but a small part of the alveolar process anteriorly. The orbital plate was softened and undergoing disintegration. He alluded to the fact, that in non-malignant tumours, absorption of the walls of the antrum occurs, but it is due, in these instances, to the pressure exerted by the growing mass. In malignant tumours pressure may exert some influence in the destructive process, but it is largely due to the disintegrating power of the growth itself. The name of "fungus hæmatodes" has been applied to these tumours when in a state of ulceration. The application of this term had given rise to much confusion in the minds of students, and should be abandoned. It is not the name of a distinct variety, but merely expresses a condition of ulceration, accompanied by hemorrhage, occurring in the well-known form of medullary or encephaloid carcinoma. The forms of benign tumours, which invade the superior maxilla, are the fibrous, fibro-cellular, recurrent fibroid, vascular, myeloid, cartilaginous and osseous. Among them, the osseous tumour occurs least frequently. The distinctive features of each of these varieties were discussed.

Mr. Heath, of London, in his Essay, (Jacksonian Prize of 1867,) states, that the only form of true cancer invading the upper jaw is, in his experience, the medullary or encephaloid; although cases are on record, and specimens are preserved, which exhibit the variety of scirrhus or hard cancer. This experience is in accord with that of the surgeons of this country.

The important point to be considered in the treatment of malignant diseases of the upper jaw, relates to the time at which the surgeon

interferes. The great tendency to return, on the part of carcinomatous growth, affords but little hope of permanent benefit; this hope is increased when the bone is removed at an early period of the disease, before it has infiltrated the surrounding structures. Nothing short of the removal of the entire bone suffices.

Dr. Atlee recommends very highly the long-continued administration of arsenic after operations for the removal of carcinomatous tumours. His success in arresting the growth of these tumeurs, and in modifying their character, has been most marked.

The different methods of operation which have been employed in excision of the upper jaw were described, and the instruments required in performing the operation were exhibited. Sometimes hemorrhage is excessive in these cases, and it is, therefore, advisable to have at hand hemostatic remedies and the actual cautery.

November 23*d*, 1870.

Prof. Mears presented two specimens, exhibiting tumours of the lower jaw, and made the following remarks upon the forms of tumours developed in connection with this bone. They are the same as those which are found in the superior maxilla, with the addition of the cystic variety, which corresponds to cystic disease of the antrum.

Fibrous tumours occur most frequently, and may be developed either internally or externally, that is, they may originate in the endosteum or periosteum. In many cases, the cause can be directly traced to peridental irritation, consequent upon retention of diseased teeth in the jaw. Where the tumours are large, operative interference for the removal of both tumour and teeth is demanded. If of small size, the extraction of the offending teeth may be sufficient to arrest the development.

Fibroid-recurrent tumours occur rarely, and differ from the simple fibrous, in the fact that they possess a trace of malignancy, manifest a disposition to ulcerate, and recur after most careful excision.

Fibro-cellular tumour, or osteo-sarcoma.—This variety is characterized by excessive development, attaining, if unchecked, enormous size. It is developed internally, and as it grows, forces its way out through the external plate of the bone. It does not become incorporated with the surrounding structures, and can be readily enucleated from its bed. Microscopic examination shows it to consist of a fine fibrinous stroma, in which numerous cells are imbedded. The name, osteo-sarcoma, has been applied to this form, owing to the presence, frequently, of spiculæ of bone, or grains of earthy matter scattered throughout the mass.

Fibro-cystic tumour, or cystic sarcoma.—In these growths exist a large

number of cysts, which distinguishes them from the fibrous or fibro-cellular tumours, in which are found occasional cysts.

Myeloid tumours occur frequently in the lower jaw, being developed between the plates of the bone. They possess a characteristic colour, described by writers as a dark maroon or claret colour. The internal structure closely resembles the tissue of healthy spleen, and, under the microscope, are found the large giant cells. Their growth is similar to that of fibrous tumours of the lower jaw.

Cartilaginous tumours are of rare occurrence, and present two forms, the endosteal and periosteal, as in case of fibrous tumours. In the endosteal form, the tumour occupies the space between the plates of the bone, and the teeth are imbedded in it. The periosteal variety takes its origin from the periosteum covering the bone, and involving the body also. This variety attains an enormous size, and frequently terminates the life of the patient, by interference with the function of respiration. Sometimes cartilaginous growths undergo the process of ossification and form the cancellated variety of osseous tumours.

Osseous tumours are of two kinds, cancellated and ivory exostosis. The former, as stated above, is the result frequently of the ossification of the cartilaginous or enchondromatous tumours. The latter locates itself most frequently upon the angle of the bone, and, in texture, is as hard and heavy as ivory.

Cancerous tumours attack the inferior maxilla quite frequently, and occur in the varieties of scirrhus and medullary or encephaloid. The former is comparatively rare, the latter being the ordinary form of malignant disease affecting this bone. It begins usually in the interior of the bone and breaks through into the mouth, and, if not checked, through the skin of the face.

Scirrhus, in distinction to encephaloid, begins in the periosteum, and manifests all the symptoms of the disease as found in other parts.

Cystic disease of the inferior maxilla, has been designated by surgeons as spina ventosa. The cysts occur in the spongy tissue of the bone, apparently without any immediate connection with the teeth, but, no doubt, they are developed by reason of some irritation produced by these organs. They differ from cysts of the antrum, in that the latter take their origin from the lining membrane of this cavity. They are of slow growth, painless, and afford inconvenience merely by their size. The anterior plate of the bone gradually yields to the pressure exerted by the increasing fluid contents of the cysts, and a large smooth tumour is formed, over which the integument is movable. Their character is readily ascertained by making pressure over the thin walls of the tumour, which elicits a peculiar, crackling sound, diagnostic of this form of disease.

In regard to the treatment of tumours of the lower jaw, Prof. Mears remarked, that much progress had been made, in this respect, during the past few years. Formerly, many jaws were sacrificed, which are, to-day, saved, and this is due to the increased knowledge possessed in reference to the nature of affections of the jaws. One of the specimens on the table illustrated the truth of his remarks; it exhibited a cyst of the inferior maxilla, involving the left ramus, and for which the third of the bone had been removed. The surgeon of to-day, accepting the excellent suggestions of the late Dr. J. Mason Warren, of Boston, adopts a more conservative practice; according to the recommendations of that distinguished surgeon, the cyst is punctured, the contents evacuated, and the cavity obliterated by crushing in its walls.

The other forms of tumours are treated in a like conservative manner. In the endosteal variety, the outer plate of the bone is removed, and the tumour detached. In periosteal growths, the mass is separated from the bone, or it may require the removal of the external plate. In all forms of benign tumours, the rule is imperative to save as much of the bone as possible.

In the operation for removal of tumours of the lower jaw, much improvement has been made in the character of the incisions. If practicable, the incisions are made in the mouth, so as to avoid disfigurement. If an external incision is required, it should be made along the inferior border of the bone, so that the resulting cicatrix may be concealed from view.

The specimens presented to the class were kindly placed at the disposal of Prof. Mears by Prof. Gross, the eminent surgeon and teacher. One, as alluded to above, exhibited cystic disease of the ramus of the inferior maxilla—the other was a specimen of cystic sarcoma of the lower jaw. The former had no history; the history accompanying the latter specimen was read, and the microscopic structure described.

CASE OF ALVEOLAR ABSCESS.

December 8th, 1870.

Through the kindness of a member of the class, Prof. Mears was afforded the opportunity of presenting to the class a very interesting case of alveolar abscess.

The following is the history of the case: C. E., æt. 16, native of Philadelphia, is employed in a button factory; family history good; the patient has enjoyed good health. Three weeks since a dentist made an attempt to extract the second molar tooth of the lower jaw and failed, leaving the roots in the alveolus. The patient experienced no difficulty from it until four days ago, at which time he was exposed to cold, and

shortly after had pain in the roots, accompanied by swelling of the face. Under the use of local application, the swelling subsided. A few days after, being again exposed to cold, the swelling rapidly increased, giving him much pain and preventing rest at night. For the relief of this condition he presented himself at the dental clinic. A member of the class, taking the case in charge, made an incision along the border of the alveolar process, for the purpose of evacuating the abscess. No pus escaped, and, on the day following, he brought the case to the surgical clinic.

The following remarks were made upon this case: "This case, gentlemen, presents itself at a very appropriate time. You will remember that the subject of yesterday's lecture was that of alveolar abscess, at which time we studied the cause, symptoms and treatment of this affection. We could not desire a better case to illustrate the subject under consideration. The history furnished by the patient is very clear, and you can readily trace the progress of the disease from its inception to the present condition. You will observe there is a large tumour, occupying the lower part of the left cheek, and upper part of the left side of the neck; it is more prominent below, and, in this portion, presents, on the surface, one or two projections. At these points the tumour feels soft, and imparts to the fingers a sensation of fluctuation. The eyelids of the left eye are swollen, and the swelling encroaches upon the left side of the nose. These conditions give a distorted appearance to his face. The tumour has a dusky-red color, and, on applying the hand to its surface, it feels hot.

"Now, let us explore the cavity of the mouth. You will observe that the patient is unable to open it to any great extent—scarcely sufficient room is afforded to introduce the finger, with which is detected the alveolus containing the diseased fangs. The space between the alveolar process of the bone and the cheek is obliterated. The mucous membrane is on a level with the margin of the teeth, and the relation of the parts much changed by the swelling. The patient complains of great pain, and this, taken in connection with the swelling, heat and redness, furnishes us with all the symptoms of inflammation.

"Let us examine into the cause of this inflammation, and, if possible, trace its progress to the present time. We can correctly say that there exist two causes—a remote and an immediate or exciting cause. We discover the first in the diseased roots of the molar tooth left by the dentist. The cold exerting its influence on these diseased fangs became the immediate cause. As the result of this, inflammation attacked the periosteum, lining the alveolus and peridental membrane of the tooth. Exudation occurred, and, finally, suppuration—an abscess being formed at the bottom of the alveolus. The inflammatory action continuing, the formation of pus increased, forced its way through the wall of the alveolus

and endeavored to reach the surface, involving the surrounding structures in its course. You will see that it has reached the surface at this point, and is prevented from escaping by a thin wall. You will remember what was said to you in regard to the mode of exit of pus; it must escape, and usually seeks a route in which least resistance is offered, destroying everything before it. It may be in this case that inflammation was excited in the periosteum lining the external surface of the alveolar process about the region of the molar teeth, the process being injured, somewhat, in the efforts made at extraction, and, in this way, the extensive involvement of the surrounding tissues may be explained.

"The treatment to be adopted in these cases depends upon the time at which the patient presents himself. If, in the early stage of the inflammation, the treatment consists in the prompt removal of the offending tooth or fangs, the free bleeding of the parts, and the employment of other antiphlogistic remedies. If suppuration has occurred, and abscess has formed, the pus should be evacuated by incisions within the mouth, so as to avoid disfigurement. This is an important consideration, and should always be borne in mind. An unsuccessful attempt to accomplish this was made in this case. Now, it is impossible to avoid making an external incision, owing to the extreme tenuity and devitalized condition of the external wall of the abscess. In a few hours the pus will burst through this thin wall, and will produce a ragged opening; therefore, it is our duty to make a clean incision, in order that as little disfigurement as possible may result. You will recall the remarks made in regard to the application of poultices upon the external surface in cases of alveolar abscess. They should not be employed, for they lower the vitality of the part, and invite the pus to the surface."

A free incision was made into the abscess, and about six ounces of very offensive pus discharged. The patient was directed to keep applied to the surface an emollient poultice, and avoid exposure to cold. As soon as the mouth could be readily opened, the fangs of the tooth were extracted.

NECROSIS OF THE SUPERIOR MAXILLA, ACCOMPANIED BY SUPPURATION IN THE ANTRUM—OPERATION FOR REMOVAL.

December 21st, 1870.

Professor Truman has kindly sent this patient to the clinic, who gives the following history: C. R., æt. 37, native of England, married; present occupation that of a house servant; was in the English army for twelve years, doing duty most of the time as officer's servant; family and personal history good. When eighteen years of age had a non-infecting

chancre; at this time he was under treatment about three months, and supposed that he took mercury. The two bicuspid and first molar teeth of left superior maxilla being worn down, he went, in the latter part of April last, to a dentist, and had them extracted. They were not carious, and gave him no pain. He thinks that they were extracted without difficulty. About ten days after he felt a dull, gnawing pain in the cavity of the first bicuspid, and this increasing, he went to the dentist, requesting a careful examination, under the impression that the pain was due to the presence of a fang left in the cavity at the time of the extraction. This was done, and nothing found to account for the pain. A few days after he observed swelling of that side of the face, and on the advice of a physician whom he consulted, the second molar tooth was extracted. The roots of this tooth had "barbs" on them. A few days later pus came out of his nose. On announcing this symptom to the dentist, he was informed that he had disease of the antrum, and was advised to consult Professor Truman. On examination, Professor Truman found the alveolus in a state of inflammation, and an opening through the cavity of the first bicuspid into the antrum, which he enlarged, and directed the patient to inject into the cavity, through this opening, medicated lotions. The inflammation was much reduced under this treatment, and the cavity kept clean.

"Having now the history of the case, you are prepared to examine it, and determine the nature of the disease. You will readily distinguish the swelling of the left side of the face, and detect also a slight defect in the articulation of the patient. On examining the mouth, you will observe that the two bicuspid and first and second molar teeth of the left superior maxilla are removed; the lateral incisor and canine teeth are loose, the third molar is firm; between the lateral incisor and the molar teeth there is a large portion of the alveolar process exposed; its surface is spongy, and pus exudes at certain points between the bone and the gum. This portion of the bone can be moved in its position; it has fallen into the mouth, as it were, and has depressed a portion of the palatal vault. The line of demarcation between the bone and the necrosed portion is well marked. The patient states that fluid injected into the antrum passes into the left nostril. Examination of the nostril shows it to be free.

"Where has been the original seat of disease in this case? The patient states that he felt a dull, gnawing pain in the cavity of the first bicuspid about ten days after the extraction of the teeth. A few days later he observed swelling of the gum of that side of the jaw, and in three or four days pus escaped from the gums and from the nostril. It would appear, therefore, that the alveolus was primarily involved, periostitis having been excited, and necrosis of the bone following. In the course of this inflam-

matory action, the antrum became involved, by reason of the involvement of its floor, which, you know, is formed by the alveolar process.

"Let us inquire into the cause. In regard to any injury inflicted at the time of the extraction, we have the statement of the patient to the effect that none occurred. He states that the extraction was effected without difficulty. You will remember, he states in his history that, at the age of eighteen, he had a chancre, followed by suppurating buboes, for the treatment of which disease he supposes he took mercury. If we regard this chancre as non-infecting, in this respect adopting the views entertained by some syphilographers, then we must exclude any syphilitic taint as exerting an influence in the production of the disease. In connection with this point, it is interesting to note the experience of Professor Truman, who informs me that in almost all cases coming under his observation, in which periostitis has followed extraction, he has been able to trace a syphilitic history. It sometimes happens that, after extraction of teeth, patients expose themselves to the influence of cold, and in this way inflammation is excited. Such may have been the cause in this case. The history of the case excludes the consideration of the poison of the exanthematous diseases, and of the fumes of phosphorus as causes.

"In our last lecture we studied the subject of necrosis, examining carefully into the causes, symptoms and treatment. On that occasion it was stated that the upper jaw was less liable to necrosis than the lower, and the immunity enjoyed by the upper, as compared with the lower jaw, is stated by Mr. Heath to be due partly to its less exposed position, and to the fact that necrosis occurs less frequently in cancellous than in compact bone. He also thinks that the difference in the vascularity of the two bones must exert an influence, the upper having a much larger vascular supply than the lower jaw. Necrosis is the result of periostitis, and the causes and early symptoms are those of inflammation of the periosteum. If the inflammatory action continues, an effusion occurs between the periosteum and bone, which degenerates into pus, and separates the membrane from the bone, and by thus cutting off the vascular supply causes the death of the bone. The importance of early interference, in order to prevent suppuration, was dwelt upon. If this occurs, you were advised to give free exit to the pent-up matter, with a view to limit the necrotic action. In the case of the upper jaw, the tendency of the pus is to open into the mouth, while in the lower jaw it reaches the surface by numerous openings along the lower margin of the bone, and sometimes at a distance down the neck.

"The effect of necrosis upon the teeth is seen in this case; the lateral incisor and canine being loose, and producing discomfort to the patient. Sometimes the involvement of the bone may be such as to leave the teeth

intact, the dead bone being removed without disturbing them. In the case of young subjects, an important consideration relates to the destruction of the germs of the permanent teeth. A specimen was exhibited to the class at the last lecture, showing necrosis of the alveolar border, in which the germs of the second teeth were preserved.

"The treatment in cases of necrosis consists, in the early stages, in combating the periostitis, by removal of the cause and free incisions into the periosteum. When suppuration has occurred, the pus should be early evacuated, in order to limit the destruction of bone. Nature constantly resists the necrotic action, and finally succeeds in establishing a line of demarcation, separating the dead from the living bone. When this has occurred, it is the duty of the surgeon to interfere and remove the dead bone, which acts as a foreign substance, and maintains the suppurative action. The dead bone, called technically the sequestrum, should be removed by incisions made within the mouth. In cases of necrosis of the entire bone, it may be necessary to resort to external incisions. It is important, in operations for removal of the sequestrum, to preserve as much of the periosteum as possible, as this membrane plays an important part in the reparative process.

"A marked difference exists in reference to the repair following necrosis, as it occurs in the upper and lower jaws. Careful researches have shown that, in the superior maxilla of young subjects, a development of fibrous tissue takes place after loss of substance. In adult life, it is stated that no effort at repair is made. M. Ollier, of Lyons, widely known in connection with the most careful and extended investigations upon this subject, notes in his work ("La Regeneration des Os," 1867,) two cases. In one, a certain amount of new bone was produced; in the other there was a development of osteo-fibrous tissue.

"In the lower jaw the reparative process occurs very rapidly, and cases are recorded in which the entire bone has been reproduced after removal for necrosis."

The patient was now placed under the influence of the anæsthetic mixture recommended by Dr. W. L. Atlee, consisting of one part of chloroform to two parts of ether, liquid measure, and a cork, which was securely fastened to a cord, was introduced between the teeth on the sound side; incisions were made on each side of the alveolus, the periosteum dissected up by the handle of the knife, constructed for that purpose, and the sequestrum grasped firmly by the forceps, and removed. Very little hemorrhage occurred. The case will be shown to the class from time to time, and the progress noted.

Dental Associations.

REPORT OF PROCEEDINGS OF PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

An adjourned monthly meeting of the Pennsylvania Association of Dental Surgeons, was held in Philadelphia, October 18th, 1870, Dr. Wildman in the chair. In the absence of the Secretary, E. R. Pettit was appointed Secretary *pro tem.*

The subject for discussion for the evening was, whether or not vulcanized red rubber contains any free mercury.

In opening the discussion, Dr. Wildman stated that he had treated the vulcanized red rubber, of different manufacturers, with chemically pure nitric acid, allowing it to stand for several days, then filtering and evaporating, leaving it, however, slightly acidulated. He had then tried the effect of this residue upon polished copper, and had found that the characteristic white spot remained upon the copper, showing the presence of free mercury. This is considered the best test. This test was also made before the Association, and resulted as above. The whalebone rubber also presented the white stain, but not in so marked a degree as the others. He was satisfied, from this test, that there was a minute portion of free mercury in the vulcanized red rubber. He also exhibited several specimens of vulcanized rubber under the microscope, in all of which, upon careful examination, globules of mercury could be seen. He said a little care was required to distinguish the globules of mercury from the crystals of sulphur, always present—the former presenting a bright metallic lustre.

Dr. Buckingham asked, if, after treating the sulphide of mercury with nitric acid, the same result was produced.

Dr. Wildman, in reply, stated that he had treated the sulphide of mercury, also, with pure nitric acid, and tested it upon the polished copper, but without other effect than the action of the nitric acid upon the copper. No white stain remained.

Dr. Buckingham said, two questions presented themselves, namely, whether the sulphide of mercury used to color the rubber was pure, or contained some free mercury, or whether it was decomposed at the temperature at which the rubber was vulcanized. The books say it is not decomposed at a much less temperature than 600° F. He had no doubt it was decomposed. He doubted if there were sufficient free mercury in it to produce any effect, either local or constitutional. He did not think the free mercury, if present, could get out of the rubber. That on the surface would soon be either dissolved or volatilized. It may be injurious in certain cases, but it was not proven that it is injurious in all. There was

no doubt in his mind that the vulcanized rubber contained some free mercury. He thought some rubber contained inferior vermilion. Rubber plates, worn in the mouth, change in a few years, either by time or the action of the saliva, or in some manner not known. They also change when kept on hand for a long time, but not in use. The secretions of the mouth get in between the teeth and the rubber, and the gases formed may act upon the free mercury in the rubber. He believed vulcanite rubber as a base for artificial teeth to be a bad thing in most cases.

Dr. Wildman stated that he had experimented with the Hard Rubber Co.'s rubber, vulcanized at 280° F., and found the same condition to exist, *i. e.*, the slight decomposition of the sulphide of mercury. A specimen of this Company's rubber, vulcanized at 280° F., was exhibited under the microscope, showing globules of mercury.

Dr. Buckingham spoke of some rubber in the market a few years ago, which, when vulcanized, became black in spots. He supposed it had been colored with red lead.

Dr. Wildman said he had tried coloring rubber with red lead as an experiment, and found it produced a black color when vulcanized.

Dr. Buckingham thought the only real test, as to whether the vulcanite base was injurious or not, was its use in the mouth. He had not seen, in his own practice, any marked case of injurious effects. He thought silver plates were better than rubber, if kept clean. Rubber plates, if not kept clean, become coated, and this coating would be some protection from the action of the mercury. Black rubber might be substituted for the red with advantage, or the rubber and sulphur without any coloring matter whatever. He thought the whalebone rubber had some kind of gum mixed with it, which gave it its elasticity.

Dr. Henry Moore thought all persons could not wear rubber plates. He mentioned a case of a lady who had worn a gold plate for some years, when she had a rubber plate made. Her mouth soon became sore and she became quite sick. When the rubber plate was left out for a few days she got well: but upon replacing it her mouth became sore again. This was repeated twice, when she returned to gold, and experienced no further evil effects.

Dr. Githens instanced a case of a lady who had worn a gold plate for several years, and then procured a rubber plate. Ever since she had been wearing it she had complained of a stinging sensation in the mouth. The mouth presented a perfectly healthy appearance. He had seen cases of sore mouth from wearing silver plates.

Dr. Wildman thought the trouble arose from the rubber being a non-conductor of heat.

Dr. Buckingham mentioned a case, in his own practice, of a lady who

had worn a rubber plate for a year, and, during that time, had complained of a burning, stinging sensation in the mouth, but only sufficient to be annoying. The mouth appears healthy.

Dr. Wm. H. Trueman thought the testimony of patients unreliable in regard to the effects of mercury. He related a case where a patient had an amalgam filling inserted, and, some six or eight months after, suffered all the symptoms of salivation, copious flow of saliva, inflamed gums, &c., for several days. Upon making an examination, he found the filling was out, and from the appearance of the cavity it had been out for *some time before the trouble commenced.* On being assured the plug was no longer there, the symptoms entirely subsided, and the patient fully recovered, although several fillings of the same material still remained. The immediate cause of the trouble in this case was the patient's reading an account published in the newspaper of a young lady being poisoned by the presence of several amalgam fillings in her mouth. Recollecting that she had one inserted a few months before, she almost immediately began to notice the evil effects of mercury, and in a short time salivation occurred, from *mercury on the brain!* The swelling and turgidity of the gums was, no doubt, due to the constant "sucking," or continued forced expectoration. He thought it possible the mercury in rubber might sometimes operate in the same way. He was not convinced that there was free mercury in the rubber. He had not been able to find its peculiar characteristics under the microscope. He thought the metallic lustre was due to minute particles of quartz, or to the oxide of zinc used in its manufacture.

Dr. Wildman said nitric acid would not act upon vermilion at all. His experience had been entirely different from Dr. W. H. Trueman's. He had first noticed the globules of mercury about two years ago, when, in scraping some vulcanized rubber, he observed a bright spot which proved to be a globule of mercury, which he removed with a needle. He had noticed the same since. He had no doubt there was free mercury in the vulcanized red rubber.

Dr. W. H. Trueman said he had tested it with gold foil, and had not succeeded in obtaining any discoloration.

Dr. Githens asked why, if there was free mercury in rubber, gold could be vulcanized in contact with it without change?

Dr. Wildman doubted if the mercury produced any injurious effects.

Dr. Wert thought there was often inflammation of the mucous membrane of the mouth, extending from the throat, and if a plate was worn it might be attributed to that. When a person had been once salivated, he thought he was more susceptible to the influence of mercury.

Dr. Wildman said, in preparing the specimens for the microscope, they

must be shaved down, but not polished, as that removed the globules of mercury. He also exhibited, under the microscope, an interesting specimen of fungous gum from the cavity of a bicuspid tooth, showing a peculiar fimbriated structure and looped blood-vessels.

Adjourned.

E. R. Pettit, *Secretary pro tem.*

THE CHARLESTON DENTAL ASSOCIATION.

At the anniversary meeting of this association, held on the 20th of December, 1870, the following officers were elected to serve for the ensuing year:

President—Theodore F. Chupein, vice W. S. Brown, who declined re-election.

Vice-President—George H. Winkler.

Secretary and Treasurer—B. A. Muckenfuss.

Editorial.

TO OUR PATRONS, FRIENDS AND CONTRIBUTORS.

Again, for the seventh time, we present our congratulations, and wish our patrons, friends and contributors a Happy New Year, expressing, at the same time, our desire for their prosperity and success. When we look back to the earlier years of our editorial career, we remember, with gratitude, the kind friends who have stood by our journal, and, by their voice and pen, aided us in our efforts to stem the current of opposition which met us at the outset, and which has ever since, in certain influential quarters, been exerted against us, and whose constant effort has been to ignore our labors, and misrepresent the institution with which we are connected. As a sample of this kind of underhand action, we append the following notice, which is sent as *truth* from this country to the *London Times*, and is then re-published in the American papers:

"An American writer, in the *London Times*, of November 28th, thus refers to our Philadelphia dental colleges: 'A few days ago the winter terms began at the various dental colleges in this country, a fact that reminds me that, while Americans of culture, to finish their education, usually go to the Universities of Europe, in the specialty of dentistry the current is reversed, the graduates of the highest medical schools abroad coming to the United States, and chiefly to Philadelphia, to finish their dental education. There are in the United States nine dental schools, two being in Philadelphia, two at Boston, and one each at New York, New Orleans, Baltimore, St. Louis and Cincinnati. Two-thirds of all the students attend the two colleges in this city, of which the 'Philadelphia Dental

College' is the chief, and it is noticed that about one-fourth of the students at this college are generally from abroad, nearly every country in Europe being represented. Of the high distinction of having graduates from the Universities of London, Vienna and Berlin come here to finish their dental education, the Philadelphians are quite proud, as they also are of the fact that their city contains the most extensive manufactory of dental instruments and artificial teeth in this country, if not in the world.'"
—*Public Ledger.*

In making this quotation, we do not pretend to charge the officers, or faculty of the college mentioned, with making this statement; but we do charge that some friend of their institution has misrepresented our college intentionally. The only reply that we shall make to the article, is to assert positively, and we are prepared to prove the same by our college books:

1st. That for the past seven years the Pennsylvania College of Dental Surgery, has had a larger number of students than any other dental institution in the United States.

2d. That this College has had more foreign students, each session, the past seven years, than any other dental institution in the United States, which, if true, is a sufficient proof of the relative standing of American Colleges in foreign countries. With this answer we shall leave the subject, unless our challenge is accepted.

In presenting our congratulations, we would also state that we shall endeavor to add to the worth of our journal, by the publication of articles of practical interest, several of which are promised from prominent contributors. We shall also publish clinical reports, which will be found to contain valuable information, one of which is published in this number. We again ask the dental public for encouragement, by contributions and subscriptions, promising to make the DENTAL TIMES second to no journal published.

BARNUM'S RUBBER DAM.

We would call attention to the advertisement of our friend Barnum, who is one of the real dental benefactors, as the use of his rubber greatly aids the operator, and enables him to perform his work satisfactorily, without regard to the flowing saliva.

THE CANADA DENTAL JOURNAL.

This journal comes to us laden each month with good articles. The editors, Messrs. Beers and Chittenden, are *live men*, fully awake to the best interests of the dental profession. The *Journal* should be on the table of each dentist in the United States. G. T. B.

Selections.

ARE THE MINERAL ACIDS FORMED IN THE MOUTH?

BY S. P. CUTLER, M. D., D. D. S.

The above is the heading of an article in the May number of the *Missouri Dental Journal*, 1870.

All publications in the journals are regarded as public property and subject to criticism.

There are some assumptions in the above article, perhaps, not founded on sufficient data to warrant belief, and some of the chemical formulæ not correctly stated. In the first place I will inquire, what constitutes a mineral acid in contra-distinction to any other acid. Sulphuric acid might with propriety be considered a true mineral acid, as one of its elements, sulphur, may be regarded a mineral element, the other element not, though an active agent or element in most acids only a few exceptions, its salts of the metals are minerals. Nitric acid is generally considered a mineral acid, though composed of two gases, neither of which could be regarded as a mineral element *per se*, neither is the acid itself uncombined mineral in character, it being a liquid under all circumstances when uncombined: but on the other hand, when combined with metallic oxides, they are strictly mineral in their character.

This acid may be regarded in one sense as of organic origin, it being formed by animal and vegetable putrefaction, fermentation by oxydation of ammonia, which is first formed in the presence of eight equivalents of nascent oxygen, the ammonia also being nascent; at the same time three equivalents of water are formed in the presence of potash, nitrate of potash is formed; nitric acid is also formed in thunder clouds, which was synthetically proven by Cavendish in 1780. These are the only known sources of nitric acid.

Hydrochloric acid or muriatic acid, also regarded as a mineral acid, is composed of two gaseous bodies, neither of which could be regarded as mineral, the acid being a liquid, its salts of the metals are regarded as minerals, more especially the halogens.

This acid is made by combustion of hydrogen in chlorine in a rapid manner and in a more gradual manner by slow chloridation of hydrogen, or by decomposition of chlorides already formed, which are minerals. Some acids are solids; others are liquid, and others gaseous.

The elements of all the organic acids are found in the mineral acids, namely: carbon, oxygen and hydrogen; which are found in all organic acids, with one exception, that of oxalic, which has no hydrogen.

There are five elements found to exist in organisms which are regarded as organic elements when so existing only. There are a still greater number of simple elements that are never found in organic life, called inorganic, not all of them mineral in their character. Some are metals, others mineral or metalloids, others gaseous. Now, all the elements found in the mineral acids are found in organisms in greater or less quantity, without any exception.

The writer of the article entertains the idea that the mineral acids may be formed in the mouth, and gives his formulæ for the same, based upon the supposed knowledge of the exact specific action of each individual acid on the teeth in the mouth. Whether or not the writer experimented with

teeth out of the mouth, with the different acids named, he does not state. This would be the proper plan in making up his differential diagnosis of decays or action of acids on the teeth.

Now there are three different and distinct forms of dental caries, the black, the brown, and the white, the first being characterized by disintegration of both dentine and dontine, or dentine and cartilage *pari passu*, leaving a discolored surface below, frequently hard and dense from the fact that this is the slowest of all forms of decay, hence more time being allowed for tubuli absorption for a short distance into the dentine below the decay, of coloring matters, and not from any specific acid action differing from either of the others; if so, I have not yet had convincing proof of the fact.

The brown variety is characterized by a removal of the lime salts down to an indefinite distance below or into the cartilage. In such cases the lime gives way faster than the animal portion, that being more resistant to such action than the lime, leaving us to conclude that the dissolved lime was in a more perfectly soluble condition than the former variety, and we might in consequence readily infer the action of either nitric, muriatic, or acetic acids in the latter case, and that of sulphuric in the former, the first three all being soluble salts, and the latter scarcely at all so. These inferences are not dicta, only hypothesis.

The white variety is more rapid and destructive than either of the others, being characterized by a softening of the whole substance of the dentine as far as the decay reaches, which easily chips away under the excavator, and is generally quite sensitive to the touch of the instrument, the line of demarcation not being readily determined by any one of limited experience, and in many instances not by the most expert and experienced, hence the result more doubtful and uncertain when filled. This variety is more especially confined to young subjects, not often met with in extreme old age. This latter or white variety does not slough away, as in the black, but remains in a more or less complete disorganized condition, not being removed *pari passu*, with the progress of the disintegration.

In the brown variety, the cartilage being retained, may be easily peeled up from the sound dentine below the cartilage so removed, showing under the microscope the tubular structure more or less intact, generally portions of them being corroded out from end to end, presenting a strongly marked baccated or beaded appearance, and I have entertained the idea that portions of such softening dentine, over the pulp cavity, in large decays, might be retained as a capping, far superior to any artificial capping, with a hope barely of subsequent ossification of this softened dentine, especially where there are live nerve fibrils, as we have reason to believe is sometimes the case where this softened portion remains sensitive to the touch, at least, no harm could be apprehended from leaving a small portion where the borders of such cavities are sufficiently excavated.

I might extend these remarks, but for the fact that I like short articles, so as not to bore my readers.

Now in relation to the chemical formulæ given in the article under consideration, there are some broad mistakes or errors in the nomenclature, perhaps from want of care in making them up or oversight, which I propose noticing in detail.

First formula: sulphuric acid, $H_2 S O_4$. As its formula indicates, it is 2 parts of hydrogen, by weight 32 of oxygen, 16 of sulphur. Now let us

see how the facts stand. It will be seen by reference to any of the text-books on chemistry that sulphuric acid consists of $S\,O_3+H\,O$; or sulphur, 16; oxygen, 24; and one equivalent of water, $H\,O$: or one part by atomic weight of hydrogen, and eight of oxygen, which is the hydrous acid; the unhydrous contains no water, and is a white solid, instead of a liquid form, E_{40}. The Nordhousen oil of vitrol consists of two atoms of acid and one of water, thus ($S\,O_3\;H\,O+S\,O_3$) equivalent to 89. This is the fuming sulphuric acid. It contains only half the amount of water, the equivalent of the common commercial acid being 49; the unhydrous being 40.

Let any person at all acquainted with chemical manipulation examine the formulæ given for the formation of this acid in the mouth, he will at once come to the conclusion that it might be impossible for any such formation to take place, even if the necessary elements be present, the requisite conditions will be found wanting.

This acid is made on a large scale by burning sulphur with nitrate of potash or soda, and conducting the sulphurous and nitrous acids which result into large chambers lined with lead, in which steam is thrown, the bottom of the chamber being covered with water. The sulphurous acid takes oxygen from the nitrous acid, reducing it to deutoxide of nitrogen. This being in the presence of oxygen in the chamber, the deutoxide instantly reassumes the condition of nitrous acid. The deutoxide continually transfers oxygen from the atmospheric air to the sulphurous acid, and brings it to the condition of sulphuric acid. Thus it will at once be seen that this acid could not be found in the mouth, the requisite conditions being wanting, even if the elements be present.

The writer says, if a fibre of meat be caught and retained between the teeth sufficient time, it decomposes part of its hydrogen uniting with part of the nitrogen, forming $N\,H_3$; its carbon uniting with part of the oxygen, forming carbonic acid, acid, $C\,O_2$; and the sulphur combining with the remaining hydrogen, forming sulphuretted hydrogen, $H_2\,S$. Now sulphuretted hydrogen in contact with oxygen of the air, is decomposed, the hydrogen uniting with the oxygen, forming water, and the sulphur set free. This sulphur being in the nascent state, and having a great affinity for oxygen, is oxidized, and the result is sulphurous acid, $S\,O_2$; which is converted rapidly into sulphuric acid, in the presence of the water of the saliva, thus: $S\,O_2+2\;H_2\,O\;H_2\,O_4\,S+2\;H$. "The acid thus formed immediately acts on the carbonate of lime, decomposing it, and charring the animal portion." The formula for sulphuretted hydrogen is H. S., and not 2 atoms of hydrogen, as above given. This feeble acid gradually undergoes decomposition in water, forming water and sulphur set free, but does not readily undergo decomposition in the air, more especially in dry air. The equivalent of this acid is 17, instead of 18, as the above writer would express. The above formula for the formation of sulphuric acid from sulphuretted hydrogen will not do as he has there given, 3 parts of sulphur, 8 of oxygen, 10 of hydrogen, which is too high.

If it were possible for sulphuric acid to be formed at all out of hydrosulphurous acid, the formula would read thus: $S\,H\,H\,O\,O_3=S\,O_2+O\,H\,O$. Or in other words, a hydrated ter-oxide of sulphurous acid, making one part of sulphur, two of hydrogen, and four of oxygen, instead of 8 of oxygen, 3 of sulphur, and 10 of hydrogen, as given in the writer's formula

above. I cannot see how this acid could be possibly formed in the mouth at all.

Nitric acid symbol, $H\ N\ O_3$, as given by the writer, is not correctly stated, though corrected in the description below. Its symbol is $N\ O_5 + H\ O$, equal to 54 unhydrous, and as it always contains one equivalent of water, would be 9 equivalents more added, is the exact formula of the books. The author says: "It is commonly prepared by the action of sulphuric acid upon potassium nitrate; the reaction is as follows: $K\ O_3\ N + H_2\ O_4\ S = K\ H\ O_4\ S + H\ N\ O_3$." None of these formulæ are correctly given; he has given one equivalent of K, one of N, and one of S, which is correct, and two of H and 7 of O, which is incorrect, and does not contain enough, lacking three equivalents; neither are the groupings correct from beginning to end.

He further says it decomposes the carbonate of lime, setting the carbonic acid free, forming nitrate of lime and water, thus: $Ca\ O_3\ C + 2\ H\ N\ O_3 = Ca\ 2\ N\ O_3 + C\ O_2 + H_2\ O$. Now none of these formulæ are correctly given; the correct formula is $Ca\ O + C\ O_2 + N\ O_5 + H\ O = Ca\ O + N\ O_5 + H\ O\ O_2$. It will be seen that the author has given one equivalent too much of hydrogen. He states that the acid decomposes the carbonate of lime and dissolves out the phosphate of lime, but cannot decompose it, and destroys the animal portion. I will advert to this further on. A piece of meat between the teeth, undergoing decomposition, might set free the elements to form nitric acid; but we have no proof of its formation in the mouth in this or any other way, and I doubt the possibility.

Hydrochloric acid symbol, $H\ Cl$. He says this acts energetically on the teeth. This is certainly true, as this is a very destructive agent when in contact with the teeth, either in or out of the mouth. His formula is not correct in point of atoms of equivalents, and not put together in the most intelligent manner, thus: $Ca\ O_3\ C + 2\ H\ Cl = Ca\ Cl_2 + H_2\ O\ C\ O$. The more accurate statement would be thus: $Ca\ O\ C\ O_2 + H\ Cl = Ca\ Cl + C\ O_2 + H\ O$; that is, the oxygen of the oxide of lime in union with carbonic acid would be replaced by chlorine, and the carbonic acid gas and water formed and set free. The atom of oxygen of the lime is liberated, and at the same time the hydrochloric acid being decomposed, its hydrogen uniting with the liberated oxygen, forming water and chloride of lime, carbonic acid escapes as gas.

The error in the writer's formula is in giving 2 atoms of hydrochloric acid instead of one, and also the resultant bichloride of lime instead of protochloride. He has not given oxygen enough to unite with his carbon and hydrogen to form two atoms of water and one of carbonic acid.

Chemical nomenclature is exact and definite in its terms, every letter and figure having a specific value under all circumstances.

Now, the writer maintains that none of the three strongest of acids has any power to decompose the phosphate of lime in the tooth substance, and that only the carbonate is decomposed, and the phosphate dissolved, notwithstanding the carbonate forms a small per cent. of the tooth substance, only 5½ part in the hundred. We have no facts to prove that two salts of lime in the tooth composition are themselves chemically united before or after entering into tooth composition; if so, even perhaps the removal of the carbonic acid, if such could be possible, would not cause the phosphate to dissolve out in the presence of a weak acid, reactions such as may and do exist in the mouth, causing the destruction of teeth.

What are the facts in the case? It is known to analytical chemists that each and all of the acids spoken of are capable of acting on tooth substance and decomposing the phosphate of lime as well as the carbonate. The phosphate of lime found in the bones and teeth is a tribasic or neutral salt of lime; that is, three equivalents of lime unite with one equivalent of phosphoric acid, which forms an insoluble salt of lime, sometimes called basic salt.

Now, when sulphuric acid is added to teeth or bones, the acid having a strong affinity for lime, one equivalent of the acids unites with one equivalent of the tribasic phosphate of lime, forming an equivalent of sulphate of lime, leaving two equivalents of lime in union with the phosphoric acid, forming a bibasic phosphate, which is now an acid salt and also a soluble salt, which is readily dissolved away by water or almost any other fluid; at the same time the carbonate of lime is converted into a sulphate, not at first in a crystalline condition. What has been said of sulphuric may be said of nitric, muriatic, and even other acids. They may all be supposed to act in the same way, which is in fact already proven by experiments on bones, in the manufacture of artificial manures, besides various other experiments by the ablest chemists.

All of the three mineral acids have strong affinities for water, and readily remove it from all organic tissues, more actively so when concentrated, leaving the carbon behind and the organic structure broken up and disorganized, so far as the acid action extends into the substance, readily removing the water or its elements from corks in bottles containing any of the mineral acids, leaving the organic tissue broken up with the carbon—left behind in a disorganized condition, which, when the acid is neutralized and washed out and dried, burns without flame.

The corks or wood so acted on by the different acids are not all the same color; that of sulphuric, dark: that of nitric, light color; the muriatic is also light, but of a different shade, which fact may have left the writer of the article alluded to to the conclusion that the different forms of decay mentioned were the result of the action of the different acids. This fact is not well established, as we sometimes find more than one form of decay in the same mouth at the same time.

The mineral acids undiluted have scarcely any action on metals, owing to the fact that the normal amount of water contained in the undiluted acid, which the acid will not give up readily to the metal to form the requisite oxide, from which the salt is formed free, water must be present, held by the acid by a weak affinity, the water readily uniting with the metal to form an oxide, then the free acid unites with the oxide, atom by atom, to form the salt of the metal.—*The Dental Register*.

PERIODONTITIS.

BY W. H. WAITE, D. D. S., LIVERPOOL, ENGLAND.

The disorder known by the above name consists in an inflamed condition of the investing membrane of the roots of teeth. It may occur on one root only, and in one spot, very circumscribed, or be found extensively spread over nearly the whole surface of the roots. Accompanying this inflammatory state, there is frequently a thickening of the peridental membrane, causing more or less protrusion of the tooth from its socket.

The symptoms are tolerably defined, and the diagnosis easy. If the opposing tooth is *in situ*, pain is experienced in striking the jaws together; while at the same time there is present a desire to grind the teeth, for by so doing a kind of temporary relief is afforded. A gnawing, boring pain, considerably aggravated when the head is laid down, and warm at night—not quite so acute as true toothache (except in the worst stages,) but quite as distressing—having a marked effect on the mental energies, some degree of concomitant inflammation about the gums in the neighborhood, and soreness to the touch—these are the chief features arising in connection with this disease.

Sometimes a patient will be unable to locate the sensations with sufficient precision to indicate the offender, and in such cases, if the teeth are gently tapped, one at a time, with the handle of an excavator, the defaulter will not fail to respond. The causes of this affection enumerated in some of our standard works are various, and, without doubt, periodontitis may proceed from numerous predisposing and exciting causes; still, probably, it would not be unsafe to say that fully 95 per cent. of these cases are attributable either to the presence of a dead pulp, or to the manipulation and treatment employed for the devitalization and extirpation of the pulp. The worst forms of periodontitis are to be found where, the cavity of decay having extended very near to the pulp cavity without actually exposing that organ, a large gold or amalgam filling has been inserted, and by reason of the conduction of thermal sensations through the plug, the pulp has sooner or later lost its vitality. Now, such death of the pulp is speedily followed by the liberation of a foul and irritating gas, which, being confined by the filling, works its way outward through the apex of the nerve canals, and coming into contact with the periosteum, acts as an irritant thereon, inducing determination, congestion, and at length inflammation. Further on the periosteum becomes detached from the root, suppuration commences, and we have as the issue *Alveolar Abscess.*

But seeing that these large fillings of metal alone are apt to produce such unpleasant consequences, we are led to consider the advisability of interposing some non-conductor between the metal and the base of the cavity. Thus, if a gold filling be intended, we may place a layer of oxychloride of zinc, or Hill's Stopping, over the floor, or if an amalgam filling is to be introduced, the oxychloride answers our purpose, and in some such way it seems probable that many large cavities among the ill-fated first molars may not only be filled, but filled with a fair prospect of permanent success. Beyond a doubt, caution and the studious adoption of every preventive measure, are not thrown away in any case of deep-seated caries, for whatever may be the merits of the treatments noted hereafter, it is certainly very annoying to have a patient return shortly after the insertion of a large filling, complaining that "this tooth is so tender, I can't bear to close my mouth."

Remedies as varied as the causes of periodontitis have been suggested from time to time, most of them valuable in some circumstances, and valueless in others. It would seem as though a special bond of sympathy were called into existence between the local affection and the general health of the patient. Cold, disorder of the stomach or bowels, indigestion, rheumatic or gouty tendencies, any and every derangement of the system, appears to act, and be reacted upon by this disease; and often-

times, baffled by the complications, and besought by the patient, we are led to give it up and remove the offending tooth, rather than encounter the apparently endless annoyance.

Happily the extreme cases are not a large majority. If "dead pulp" can be clearly diagnosed, (and the history of the case, taken together with the opacity of the tooth's appearance, will generally afford decisive evidence,) and if the case presents early, say, within two or three days of the commencement of uneasy sensation, there is no quicker or surer method of procuring relief than to remove the filling, open freely into the pulp cavity, and afford a vent for the gas pent up therein, thoroughly cleansing the canals from every particle of dead tissue, and treating with dressing of camphorated spirit, followed by dilute carbolic acid, &c., till all offensive odor has disappeared, and finally, when the condition of health is fully established, filling the canals, and refilling the outer cavity; or, if for any reason it be considered undesirable to remove the filling, (and this may often be the case,) an entrance can be made from the neck of the tooth, just at the margin of the gum, into the pulp cavity, by drilling right in through the bone, with a sharp spear-pointed drill. This is known technically as "odontrypy." Drills may be easily made of broken excavators, suitable for this purpose, and, if the tactile sense of the operator is sufficiently acute, he will observe that just as the instrument punctures the pulp-chamber, it will be felt to stick, and by this he will know that the object is accomplished. Frequently, moreover, on inquiry it will be found that the patient has tasted the peculiarly unpleasant gas thus let out into the mouth. As a rule the symptoms rapidly subside after the gas has escaped. Complete restoration may be facilitated by placing a guard of gutta percha on the teeth of the opposite side of the head, to prevent closure of the jaws upon the affected tooth, and so shield it from irritation of that sort; also, by carefully drying the gums, and then painting the part with the officinal tincture of iodine, or the mixture given below. When periodontitis supervenes on devitalization and thorough extirpation, palliative treatment is indicated, free lancing of the gums, copious bleeding, after which cold applications, without and within the mouth, liberal use of iodine, or the iodine and aconite, which last is certainly an excellent remedy. Again, it has been suggested that *Mercurius Vivus*, the third decimal trituration, given in small doses two or three times a day, is a specific in such case. This is also a good medicine, but scarcely infallible. Indeed, it is more than doubtful if anything is absolutely certain. The wise practitioner, however, is ever ready to employ any means which the peculiarities of the case, or the experience of his fellows, may suggest; and in this, as in all other affections, will not be bound by prejudice simply to follow a beaten track, but be ready on occasion to exercise his ingenuity to discover the best treatment for each case as it presents, always bearing in mind the intimate relation that exists between this disorder and nearly every phase of systemic trouble.

Perhaps one of the greatest evils associated with this form of dental disease is the fact that patients do not generally recognize the true cause of their trouble. Neuralgia, or *tic*, as they call it in some places, seems to be a sort of universal scapegoat, on whose back are laid all kinds of dental difficulties, and to get rid of which the patients will swallow any amount of physic before they wake up to realize wherein the mischief truly consists, and then too often the disease has passed into the suppurative stage.

The last hint as to the treatment of periodontitis, therefore, is never to fail in warning a patient of the possible result in every case, where there appears any reason to suppose that sooner or later the disorder may appear.—*Canada Dental Journal.*

ON THE USE OF SKIMMED MILK AS AN EXCLUSIVE DIET IN DISEASE.

BY S. WEIR MITCHELL, M. D., MEMBER OF THE NATIONAL ACADEMY.

My design in this, and the brief papers with which I hope to follow it, is to give my own experience in the use of skimmed milk as an alterative diet in certain cases of disease.

After reading Carel's paper, some years ago, I began to employ this very useful method of treatment, and since then have found repeated reason to congratulate myself upon the success which, in my hands, it has attained whenever the cases for its use were selected with discretion.

In dealing with the subject, I shall first make some general remarks upon the mode of using milk, and upon the effects observed in nearly all cases. Next, I shall relate histories of its employment in gastric disorders, in diarrhœa, in malarious and renal dropsies, and, finally, in nervous maladies. I hope to conclude with a study of the influence of the milk-cure upon the secretions and excretions. In following this path, I shall in some cases differ from Dr. Carel; but, in general, my views will be found to correspond with those held by this physician.

The milk is to be used as free as possible from cream; and if, as is generally the case in our cities, there is an abundance of ice to be had, I prefer to let the milk stand in a well-chilled refrigerator for twenty-four hours. It should then be carefully skimmed, after which it is fit for use. As Carel remarks, the quality of the milk goes for something, and perhaps, too, the surroundings,—since I have found persons who could not bear the treatment in a city, while in the country they throve under it admirably. As to temperature, it may be given warm—not hot—or cold, as suits the taste. In rare cases, where at first it caused nausea, I have had to use with it more or less lime-water during the first few days. In other instances the repugnance to its taste is a difficulty; and this may be overcome by faintly flavoring it with a few drops of coffee or with caramel. Other patients prefer to add to it a little salt; but, as a rule, I desire to give the milk alone as soon as possible.

Quantity.—The patient takes, to begin with, one or two tablespoonfuls on rising, and every two hours during the day. When I followed Carel's rule of giving at once half a tumbler to a tumblerful (two to six ounces,) four times daily, I found that few patients would bear it without nausea and early disgust. I increase each dose by a tablespoonful every day—say three the second day and four the third day. Thus, if the patient begins at eight A. M., he takes, up to ten P. M., eight doses—that is to say, about sixteen ounces. Now, this is the lower limit; nor have I been able, in the cases of females or delicate men, to give it more largely at first. Indeed, few women of sickly or sedentary habits are able to exceed, at any time, a pint and a half daily. After the fourth day it is best to separate the doses as you increase their amount, until they are taken at four equal intervals daily and the maximum quantity is attained. This

varies greatly: I had one patient, a railroad contractor, who, living an out-door life of the most active kind, took daily for more than a year fourteen tumblers of skimmed milk, and this alone. Two quarts a day is the limit with most of my patients. I suspect, from Carel's account, that Russian patients must have more hardy stomachs.

Where people are well enough to live afoot, I have had little difficulty in the use of the milk; but in very feeble persons—and I have often given it to such—I have found it absolutely necessary to use with it, for a few days, brandy or whiskey, and even beef soup, all of which I expect to abandon so soon as the patient can take milk enough to sustain his strength.

It is needless to say that for a patient to take steadily a diet of skimmed milk alone requires the utmost fortitude, and all the moral aid which the physician can give. Carel thinks the first week the most difficult one, and this is usually the case; but sometimes the whole period of milk-use is one long struggle, even after we begin to allow a partial use of other diet. It is not, in these cases, hunger, but simply the craving for other food which tortures the patients. Most of them avoid the sight of food, in order to control their desires; and in one case I was much amused at a gentleman who said to me, in a guilty tone, "Indeed, doctor, I could not help it, but I stole an egg this morning."

Dr. Carel begins to alter the diet of milk after two or three weeks. I prefer to reach the latter limit before giving other food; but this, after all, is a matter for separate decision in individual cases. My own rule, founded on considerable experience, is this: Dating from the time when the patient begins to take the milk alone, I wish three weeks to elapse before anything be used save milk. After the first week of the period I direct that the milk be taken in just as large amount as the person desires, but *not allowing it to fall below a limit which, for me, is determined in each case by his ceasing to lose weight.* Twenty-one days of absolute milk-diet having passed, with such exception as I shall presently mention, I now give a thin slice of stale white bread thrice a day. After another week I allow rice once a day—about two tablespoonfuls—or a little arrowroot, or both, as circumstances may dictate. At the fifth week I give a chop once a day, and then, in a day or two, another at breakfast; and after the sixth week I expect to return gradually to a diet which should still consist largely of milk for some months. In children I sometimes use raw in place of cooked meat for a time; but grown people will rarely take it, although very often they are willing to take raw soup (Liebig's.)

The symptoms developed under the use of milk are very interesting, and not all of them are told by Carel.

In no case have I seen any one gain weight during the first few days; but where the treatment succeeds, the patient soon ceases to lose, and then slowly gains in weight. This is usually the case in severe gastric and intestinal cases; but in some persons the loss of weight continues even after they are taking an amount of milk usually sufficient to sustain the body in an equilibrium. This is remarkably the case in very fat persons, who, as every one knows, are quite commonly small eaters. Taking three cases of dyspepsia at random, (all women,) I find this record: The first lost in two weeks 14 pounds of a weight of 131; the second lost 18 pounds of 120; and the third, 11 pounds of 117, her total weight at the start. In another case, where the quantity of milk taken was two

quarts daily, and the exercise small, the man lost weight steadily up to the time that I began to give bread, when the gain was immediate and speedy, (case, diarrhœa.) Mrs. S., æt. 47, weight 194 pounds, inactive, sallow, feeble, dyspeptic, and a very small eater, lost, in four weeks, 30 pounds, with general gain in strength and vigor.

The state of the skin has seemed to me to improve in all cases of chronic gastric or intestinal disease, but in others there has been no change. The urine, in a few cases, is somewhat annoying during the first week, the patient having frequent calls; but commonly no such complaint is made, although in certain dropsies I have have found the milk to act strictly as a diuretic. The changes in the urine we shall have occasion to study in future.

The tongue is very apt to become furred, and to remain white and rough for two or three weeks, and in some cases so long as milk is taken; but so far is this from representing a disturbed state of stomach that the dyspeptic usually finds himself, after a few days, in the enjoyment of an amount of digestive comfort long a stranger to his viscera.

The stools begin to show the milk tint—a yellowish or salmon hue—after forty-eight hours, and when the milk disagrees they are apt to be loose, while usually they are intensely tough and constipated. This feature of the use of skimmed milk is at times most obstinate and annoying. After some weeks of creamless milk, I have often resorted, in such cases, to unskimmed milk, and with good effect; but it is quite clear that even this, in adults, may constipate, as it never does in the child. Carel says that a little coffee in the morning is often sufficient to relieve the bowels; and, where a small cup of pure coffee can be used, this is true. I give it without sugar. Later in the treatment, fruit, fresh or stewed, may be used; but, as a rule, I find that a little Saratoga water on rising, and a half-grain of aloes with a grain of ginger at night, will answer; or, if these do not, then an enema is required. In some cases this symptom is simply unconquerable by any constant treatment, and twice it has forced me to abandon the milk. In another case—a lady who undertook the milk-cure unassisted—I was sent for on account of violent rectal and sciatic pain which followed every effort at defecation. She said she had had a daily stool, which was true, but the amount passed was trifling, and her rectum was packed with feces so tough as utterly to defy injections until I had mechanically broken up the mass. The pulse is usually quickened until the milk-diet is large enough to sustain the weight unchanged, when it falls again. In certain cases of hypertrophied left ventricle with palpitation of the heart, the immediate effect is to lower the pulse and quiet the heart. The temperature I have only noted in two recent cases. I shall speak of it fully in a future paper. The nervous system is not strikingly affected by milk. I have once only, in a very stout and hysterical lady, seen vertigo and faintness follow its use and forbid its continuance; but, as a rule, it is in such persons soothing alone.

Carel makes no mention of one symptom of which many patients have spoken to me; this is an intense sleepiness. It is common, but not universal, and soon passes away.

In this brief sketch I have told plainly my own experience; and this I shall now illustrate by cases—only some few of which I shall relate in detail.

In no diseases has the value of milk-treatment been more clear than in

certain instances of stomachal disorders. It is needless to add that I have quoted here only such instances as had proved rebellious to all ordinary methods.

T. C., æt. 14, a frail and pallid lad, employed as errand-boy in a sugar-refinery, where he contracted the habit of continually eating sugar. After some weeks he began to have sick stomach, and at length incessant vomiting, for which a variety of treatment was employed without relief. Finally it was found that he was able to keep down small quantities of milk diluted with equal parts of lime-water. The amounts taken were still too small to sustain life, and he wasted rapidly. At this time he fell under my care, and was at once put upon an exclusive diet of skimmed milk, taking two tablespoonfuls every two hours. The vomiting ceased at once, and as the milk was increased in amount and the interval lengthened he began, in a week, to gain weight. In two weeks he was doing well on a quart a day, and at the twenty-first day he began to take bread. At the fourth week a chop was added, and at the fifth week he went to the country. At this time he was gaining weight and color. He felt none of the gastric distress after the third day, but the sleepiness was well marked for two weeks. At the second week a slight return of emesis obliged him to lessen the dose for a few days. In him, as in most young people, the constipation was readily overcome by a rhubarb pill at bed-time.

Miss C., æt. 52, has had, for a year, attacks of violent pain, which are referred to the pit of the stomach, or rarely lower. They had no relation to her meals, but were easily brought on by fatigue. The natural ending of these spells seemed to be in slight emesis, and for a long time the very least vomiting gave instant relief, which, however, ceased to be the case after a year, when the attacks had become as frequent as two to four a week. The most careful search discovered no gall-stones in the stools, and only once was there bile in the urine. The matter vomited was rarely the food, but only thin mucus, not acid, and containing no sarcinæ or other substance which cast any light on the case. Alkalies, tonics—for she was very pale and feeble—stimulants, acids, pepsin, arsenic and bismuth were used in vain. Hypodermic injections and opiates internally alike failed. In this therapeutic despair—even change of air having produced no good result—I advised the use of the milk-treatment; and, as her case illustrates alike the value and the difficulties of this plan of diet, I conceive it to be very instructive.

At this time her attacks were of almost daily occurrence. The milk was given cautiously—a tablespoonful every two hours—for two days, when it was doubled. On the fourth day she took four tablespoonfuls at each dose, and at the same intervals, but was manifestly not losing weight, although weak. A little whiskey added thrice a day bridged over this trouble, and was abandoned on the seventh day. Up to this time she had no attack, nor had she any up to the beginning of the fourth week, when the milk was given up. The reason for this was twofold. Her disgust at the diet was unconquerable; nor was I able by slight changes to secure continued good results. More complete alteration of diet brought back the attacks. I yet believe that these difficulties might have been overcome; but in her the milk caused a constipation so utterly invincible that not even the most powerful purgatives or enemata were of any avail. Needless to say that, with the promise of so much good from milk, no means was left unused to enable her to take it, but all alike failed us, and

I was forced, in this case, to confess myself beaten. Mechanical means were finally needed every few days to break up the tough rectal accumulations, and so the milk was given up. Her case was probably gastrodynia.

Somewhat like it, in certain respects, was the history of a man who was sent to me from Elkton, Maryland, by my friend Dr. Ellis:

About nine months before I saw him he began to have increasingly severe attacks of pain, which came on an hour or two after meals and lasted nearly up to the next meal. The pain was sharp, and was referred to the epigastric region and to the left side below the ribs. There was a good deal of wind, occasional acid stomach, and no tenderness anywhere; bowels regular, urine high-colored, but free from albumen and depositing urates abundantly. He had been skillfully treated with a variety of drugs, but with no relief. On explaining to him the milk diet, he professed himself able to carry it out. About two months later he returned to show himself, when I learned that he had lived on milk alone during the whole of this time, with immediate, enduring, and absolute relief from all his pains. He was then directed how to return to his usual diet. Several months afterward I learned that he was still living partly on milk, and was well and vigorous.

Mrs. B., widow, æt. 33, had for years suffered from constant acid dyspepsia, for which she had been treated by several physicians, both at home and abroad. Her only relief consisted in the most careful choice of a minimum amount of food, and in the constant use of bismuth. She weighed 118 pounds, and was sallow and disfigured by an eczematous eruption.

During the first day of the milk-cure she took only one tablespoonful every two hours, and after this it was increased as I have described. In a week she was taking a little under a quart daily, and her weight was down to 114 pounds. A little whiskey was now added, and left off at the fifteenth day, when she was taking over two quarts of milk. The weight continued nearly steady up to the end of the third week, when she declared that even the perfect ease attained as early as the third day of the treatment was scarcely a compensation for the horrors of this exclusive diet. A little persuasion, however, enabled me to continue its use another week, when I began to give stale bread, and in a few days later venison. Her gain in weight from this time was strangely rapid, and five and a half weeks after we began the milk brought her up to 129 pounds, with a perfectly clear and spotless skin. The aloes pill and enema answered throughout to control her bowels.

It is now nearly a year since this time, but despite her final abandonment of milk, she retains alike her good looks and comfort in digestion, having had in this time only one relapse, which yielded to a brief return to the diet.

The above cases, selected for various reasons, are merely representative of difficulties or successes, and it would be quite possible for me to multiply either class. Suffice it to say, that in old and unmanageable cases of dyspepsia, and in neuralgic disorders related to the gastro-intestinal viscera, the treatment by milk has been sometimes a reliable resource when without it I must have been in therapeutic despair.—*The Medical Times.*

NECROSIS FROM SKATING.

Prof. Moses Gunn, of Rush Medical College, Chicago, Ill., (*Chicago Med. Journal*,) recently exhibited four cases of necrosis of the tibia, occurring in boys and young men. One case was remarkable chiefly on account of the large extent of superficial ulceration as compared with the small amount of bone disease. Again, another fact worthy of remark was, that they were so often caused by skating. A young man skates for several hours on a very cold day, comes home chilled through, and goes through the familiar history of necrosis. All of the above cases were young men and boys, and three out of four contracted the disease by skating.

FACULTY.

T. L. BUCKINGHAM, D. D. S.,
PROFESSOR OF CHEMISTRY.

E. WILDMAN, M. D., D. D. S.,
PROFESSOR OF MECHANICAL DENTISTRY AND METALLURGY

G. T. BARKER, D. D. S.,
PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS.

JAMES TRUMAN, D. D. S.,
PROFESSOR OF DENTAL HISTOLOGY AND OPERATIVE DENTISTRY.

JAMES TYSON, M. D.,
PROFESSOR OF PHYSIOLOGY AND MICROSCOPIC ANATOMY.

J. EWING MEARS, M. D.,
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J. M. BARSTOW, D. D. S.,
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DEMONSTRATOR OF OPERATIVE DENTISTRY

T. L. BUCKINGHAM, DEAN,
1206 *Vine Street.*

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The Fifteenth Annual Session, 1870-'71.

PRELIMINARY LECTURES AND INSTRUCTIONS.—The Dispensary and Laboratory of the College will be opened on the 1st of September, where ample opportunities will be afforded the student, until the close of the session, for the prosecution of the practical part of the profession, under the guidance and supervision of Demonstrators of known integrity and capability; and during October Preliminary Lectures will be delivered. In this month, as well as through the entire session, a clinical lecture will be given, and operations performed by one of the Professors every Saturday afternoon.

THE REGULAR SESSION

Will commence on the first Monday in November, and continue until the first of March ensuing. The course is so arranged that about eighteen lectures will be delivered each week on the various branches taught in the College. A synopsis of which is given below:

CHEMISTRY.

The Course of Instruction from this Chair will commence with the considerations of the forces that act upon matter, and the laws which govern those forces Chemical nomenclature, the individual elements, and the compounds resulting from their combination, will then be considered. The course will be illustrated by diagrams and such experiments as can be performed before the class.

MECHANICAL DENTISTRY AND METALLURGY.

The instructions from this chair will embrace—the proper fitting up of a dental laboratory, the use of tools, refining, melting, alloying, and working of the precious metals, and the properties and combinations or alloys of the base metals used by the dentist; the description of the materials, their preparation, and the most approved formula for making porcelain teeth and blocks, together with the proper manner of compounding them; the history and properties of all substances called into requisition in making dental substitutes; the entire range of manipulation of the different materials used as a base, from the impression to the completion, and proper adjustment of the case in the mouth, and such other information as appertains to this chair. The lectures will be amply illustrated by specimens, models and diagrams, and the practical application will be given in the Laboratory, under the supervision of an accomplished Mechanical Dentist.

DENTAL PATHOLOGY AND THERAPEUTICS.

The lectures delivered from this chair will embrace General Pathology, Dental Pathology, the Pathological Relations of the Teeth to other parts of the System, together with a minute description of all special diseases that have any relation to Dental Surgery, or of interest to the Dentist. They will also include a careful examination of therapeutic agents and their general application. Their indication in the medical and surgical treatment of diseases of the mouth, both idiopathic and symptomatic, will be fully illustrated. Special attention will be directed to the application of all the Anæsthetic Agents.

DENTAL HISTOLOGY AND OPERATIVE DENTISTRY.

The lectures of this department will embrace the comparative anatomy of the teeth, the functions and microscopical pecularities of the dental organs, the development of teeth and their component tissues. It will also include a full description of the materials and instruments used in operative dentistry, and will comprise a thorough elucidation of all the operations required of the Dental Practitioner, such as filling, extracting, regulating, &c. &c. A portion of the course will be devoted to a description of the microscope and the modes of preparing specimens. The incumbent of this chair will practically demonstrate in the clinic the theories taught.

PHYSIOLOGY AND MICROSCOPIC ANATOMY.

The lectures from this chair will include a consideration of the entire subject of human physiology and physiological chemistry, with such portions of comparative physiology as are essential to a comprehensive understanding of the subject; also, the doctrines of life and organization. They will be amply illustrated by appropriate chemical experiments and vivisections.

The minute structure of the organs involved in the organic and animal functions will be carefully described and illustrated by diagrams and the class microscope.

ANATOMY AND SURGERY.

The instruction in this department will embrace a systematic course of Lectures on Descriptive and Surgical Anatomy, fully illustrated by dissections on the *cadaver*, preparations, models, drawings, &c.

The minute anatomy of the various organs and tissues of the body will be shown by the class microscope, and particular attention will be given to the demonstration of the anatomy of the head and face.

Clinical instruetion in the diagnosis and treatment of the surgical diseases of the mouth will be given once a week by the incumbent of the chair. Students will thus have the opportunity of studying oral diseases, and witnessing the operations adopted in their treatment.

CLINICAL INSTRUCTIONS.

In addition to the above, with the exception of Saturday, four hours are daily spent by the student in actual practice under the supervision of the demonstrators.

In the Operative Department.—To afford every facility to the student to acquire a thorough practical knowledge of this branch, the operating rooms are furnished with twenty-eight chairs, so arranged as to command the best light, and all the appliances for comfort and use. To these chairs the students are assigned in classes, and certain hours are fixed for each member of the class to operate. Every student is required to provide his own instruments, except those for extracting. He is expected to keep them in perfect order, and will be provided with a place in which they can be locked when not in use.

In the Mechanical Department.—In the Laboratory are all the conveniences for the preparation of the metals, manufacture of teeth, single and block, mounting, &c. Every process known in the profession, which has any value to the mechanical dentist, is fully taught, and receipts of valuable compounds are freely imparted; and the student is required to go through all the necessary manipulations connected with the insertion of artificial teeth—from taking the impression of the mouth to the entire construction of the denture, and its proper adjustment in the mouth of the patient. Every student is required to furnish his own bench tools, and will be provided with a drawer which he can lock.

Practical Anatomy.—The great facilities for the study of practical anatomy to be found in Philadelphia, in several well ordered and supplied dissecting rooms, present to the student advantages for its prosecution superior to those offered in any other city.

Hospital Clinics.—In addition to the facilities afforded by the College for a thorough course of instruction in the theory and practice of dentistry, the celebrated hospitals and clinics of the city constantly enable the students to witness various important surgical operations which are highly interesting and instructive. The medical and surgical clinics of the Pennsylvania and Philadelphia Hospitals, two of the largest eleemosynary establishments in the world, are open to medical and dental students, free of charge.

FEES.

Matriculation, (paid but once,) - - - - - - - - - -	$5 00
For the Course, (Demonstrator's ticket included,) - - - - -	100 00
Diploma, - - - - - - - - - - - - -	30 00

TEXT BOOKS AND WORKS OF REFERENCE.

Gray's, Leidy's, Wilson's, or Sharpey & Quain's Anatomy; Carpenter's or Kirke's Physiology, (English editions); Dalton's or Flint's Physiology; Tyson's Cell Doctrine; United States Dispensatory; Pereira's, Biddle's or Stille's Therapeutics: Fownes Elements of Chemistry; Brandt & Taylor's Chemistry; Lehmann's Physiological Chemistry; Flint's Practice of Medicine; Wood's Practice; Tomes' Dental Surgery; Harris' Principles and Practice; Taft's Operative Dentistry; Richardson's Mechanical Dentistry; Wildman's Instructions in Vulcanite Work; Barker on Nitrous Oxide; Gross' or Erichsen's System of Surgery; Paget's Surgical Pathology; Hartshorne's Conspectus of the Medical Sciences, or other standard works on the same subjects.

QUALIFICATIONS FOR GRADUATION.

The candidate must be twenty-one years of age. He must have studied under a private preceptor at least two years, including his course of instruction at the College. Attendance on two full courses of lectures in this institution will be required, but satisfactory evidence of having attended one full course of lectures in any respectable dental or medical school, will be considered equivalent to the first course of lectures in this College. Also satisfactory evidence of having been in practice five years, inclusive of term of pupilage, will be considered equivalent to the first course of lectures.

The candidate for graduation must prepare a thesis upon some subject connected with the theory or practice of dentistry. He must treat thoroughly some patient requiring all the usual dental operations, and bring such patient before the Professor of Operative Dentistry. He must, also, take up at least one artificial case, and after it is completed, bring his patient before the Professor of Mechanical Dentistry. He must, also, prepare a specimen case to be deposited in the College collection. The operations must be performed, and the work in the artificial cases done at the College building. He must also undergo an examination by the Faculty, when, if found qualified, he shall be recommended to the Board of Trustees: and, if approved by them, shall receive the degree of Doctor of Dental Surgery.

For further information, address

T. L. BUCKINGHAM, Dean,
No. 1206 Vine Street, Philadelphia.

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ALL THE INSTRUMENTS AND TOOLS required can be procured for from $15.00 to $20.00.

THE

DENTAL TIMES.

VOL. VIII. PHILADELPHIA, APRIL, 1871. No. 4.

Original Communications

NOTICE TO SUBSCRIBERS.

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ADDRESS BEFORE THE ALUMNI ASSOCIATION.

BY JAMES TRUMAN, D. D. S.

Another year has been added to the past. Another twelve-month of varied experiences has entered the great maelstrom of human life. Another atom in the unending cycles of eternal thought has been gathered to a final account. The memory of childhood comes to maturity as a golden retrospection, diversified it may be with shadow and sunshine, but ever beautiful with childish glee and care-free responsibility. Middle life gathers its robes about it, and wonders at many things performed at the ripe age of twenty-one, marveling at the absurdities and crudities of that ever active period; and old age, with its outlook on another clime, regards all the changes of life as the uneasy dream, from which it will soon be aroused to meet the stranger that sooner or later enters unbidden at every door way. But ever the years roll on, and the unceasing hum of an active life murmurs the requiem of departed days, and the mourners over wasted hopes, wasted hours, wasted ambitions, go about the streets with none to comfort or aid. Who can bring back the hours, who can nurse into newness of life the moments as they fleet into the shadow? None! These reflections, trite though they may be, are pertinent to the great duties we are met together to perform. Each anniversary, as it comes, should lead us one and all to ask the question—have my hours been consecrated to anything above self? Have the moments ever been hallowed, by a crucifixion of lower aims and ambitions, to a single hearted devotedness to the education of those not possessing my advantages, to the elucidation and formation of new ideas and more convenient appliances; *in a word*, to the elevation of my colleagues? Have I, in the past, trustfully, hopefully and energetically, worked for the common weal, that in the end my life may not have been in vain? Who can answer these questions affirmatively? I fear *not one;* but in so far as we approach to it, in so much as we have

succeeded in attaining it, just so near are we to that self-sustaining power that is so necessary to the building up of a truly great professional life.

I welcome you to-day to these halls, not as students, not as probationers, waiting with anxiety for a knowledge of the fate that may be in store for you; but as fellow practitioners, traveling the same road, possessed with the same desires, imbued with the same aspirations and aiming at the same degree of perfection as myself. As colleagues of an honorable profession we come together to give the right hand of friendship to each other, to renew the olden time, when hand in hand we received the seed of information which has in so many instances borne the richest fruitage. We come together as brothers, and in the fraternal greeting we recognize the fact, just adverted to, that the years glide on, but in the gliding, the seams and marks of the silent traveler are plainly visible. All this is well. The advanced line of battle should always be held by the veterans of many a crusade, against the legions of ignorance, and as they depart, younger soldiers take up the position. So, ever advancing, the field can never be wholly lost. I welcome you all, from whatever clime you may have come, and trust that in the end you will feel that it has been good that you have left for a brief season your professional labors, and have gathered around your *alma mater* to welcome and be welcomed. To my mind, there is no question more legitimate to the duties of this meeting than, "What contributes most to professional power?" It is a question that each and all must analyse, and, if possible, endeavor to reach a solution. We all profess, or should profess to believe, that knowledge is power, or, in other terms, that he wields the greatest force in the world whose education has been the most perfect. While this is true, and almost axiomatic in its truthfulness, the modes to be adopted, the means to subserve the great end in view, are by no means so clearly defined. In no branch of human training have we cleared a path entirely free of difficulties, and we cannot claim an exception in favor of our own profession. Young in years, still encumbered with crude ideas, inseparable from this period of experience, we have largely developed in our professional brain an overweening self-consciousness that we have accomplished very much for our boyish age. But the boy is growing into the man. As the garments are being changed for adult life, there comes the knowledge that the limit of our information is circumscribed to a degree that borders on the ridiculous. Time is fast verging into the half century since the profession of dentistry may be said to have been born. It had a life long anterior to this, but it was crude, misshapen, simple in its aims and narrow in its cultivation. Slowly the child has matured, yet rapidly, when the difficulties that have surrounded this growth are taken into consideration. The stepping stones in its history are

plainly marked and can be read by all. We see the progress, but we cannot realize the difficulties that have environed each step; the hours of anxiety, of hard labor, of deep study, that have formed out of chaos the beautiful structure we now behold.

The lesson of the past is full of significance, is replete with instruction, and affords a basis for future speculation and growth. Nineteen years have passed into oblivion since this college was organized under the name of the Philadelphia College of Dentistry! Since then circumstances have rendered a change of title necessary, but it is the same in all respects, except such as time would bring. The alumni of the old are recognized as those of the new, and must ever be recognized as one brotherhood, with common aims and aspirations. Each year since that period of organization, has there been an incoming and outgoing of a class of young men, eager to be instructed in all that appertained to their profession. Each year has added to the sum of intelligent workers. The good results were not immediately manifest, and many were ready to point to the fact that but few graduates took high positions, as an argument that dental colleges were a failure; *forgetting* that years must elapse before the young fledgling could take an independent flight. But that argument has ceased to have force. The graduates of the past are taking the lead. Our associations, national and local, are principally managed by these, and it is to their influence for good that we see, to-day, that intense eagerness to be classed with those who have earned their degree.

When I recall the early days of dental education and compare them with those of the present, I feel that progress has truly marked our career. When I remember the names of a Harris, a Wildman, an Arthur, a Maynard, in the great work of regeneration, the question, "What contributes most to professional power?" is answered, and it might be given in one word, *education*. These men, as well as a host of others, have builded that others might reap, have given of their intellectual force that you and I are enabled to perform works worthy of our generation. But, if we profit not by their example, we will have no future worth the record.

I do not belong to that class of mind that stands ever ready to ignore the past and the benefits derived from it; but it is the ever living present we now have to deal with, and the needs of that near future that will hold us accountable if we fail to do the work of the hour. Are we, then, performing our whole duty? This each must answer for himself, but to my mind there are many things yet to be done, and it is the purpose of this brief address to point out some of these.

When medical and dental colleges were organized in this country, the importance of a thorough preliminary education was felt and considered;

but owing to the peculiar condition of the country, this could never be made an absolute requirement before entering a school. The country was new, it required professional men in large numbers to meet the wants of the different communities, and it was therefore left to the individual to judge of his own fitness to commence the career he had chosen. The result has been in many respects injurious. We see it painfully manifest in the medical profession, where the dead weight of ignorance cripples the energies of the more enlightened, and makes American medicine a by-word and reproach in Europe. In dentistry the same results in degree have been reached. In the earlier years, the strong, natural ingenuity and practical ability of our countrymen, enabled them to take a leading position. They accomplished miracles, and were and are the wonder of the world in this department; and because they have done this many are deceived into the belief that any further advance in education is of very little if any value. Here lies our great peril. Self-complacency has destroyed individuals, has sapped the life of nations, and ended in their total destruction. The result cannot be different with our profession. It is only by an humble appreciation of our great needs, of our fearful shortcomings, that we can hope still further to progress and keep in the vanguard of the advancing hosts. We have passed through the early period of our professional life. The cultivation of the mechanical details absorbed, and properly so, the minds of the best thinkers and workers in our midst. This was the great need. Without this, theory was valueless; indeed, without it the profession itself ran in danger of becoming a monster of malpractice. But we have given our years of best thought in this direction. We had almost perfected the mechanical branch when vulcanite, with its quacks, came as an avalanche upon us, threatening to overwhelm all that was good in this direction, and to destroy the labors of a half a century. How much injury this has accomplished is known to you all, and I need not dilate upon it. The operative branch has had its trials, its days of amalgams and plastic fillings, but the good sense and true faith of the many have so far stood as a wall of adamant against the insidious approaches of these fell destroyers. Over all these, operative dentistry has advanced with rapid strides, until it would seem that there can be but little left to wish for. We have learned to build our foundations well, and are no longer in doubt in regard to the result of the majority of our operations. Having, therefore, carried the two main branches of our profession to a point at which they can be left to that gradual growth and improvement that years will bring, are we not prepared for greater efforts in other departments?

The distinct propositions that I would then submit to your considerations are these:

1st. Is a preliminary examination necessary before entering the study of dentistry?

2d. Should the time of study be lengthened?

3d. Is it necessary to enlarge the knowledge of collateral branches?

4th. Are compulsory laws, requiring a grade of ability, expedient?

I am fully aware of the difficulties that meet me at the outset in the consideration of the first query. Some of these have been already adverted to; but in the consideration of a question, the difficulties to be encountered are not to be taken into account. Is the path to be pursued a proper one? This decided upon, there is but one course to pursue, and that an unswerving devotion to its attainment. It must be apparent to every reflecting observer, that no structure of any value can be reared upon an insecure foundation. As this is true in architecture, so is it equally true in mental culture. The man who begins to study at the top of the ladder finds himself, instead of advancing, to be ever, crab-like, crawling backward in the laborious effort to find the first round. That the labor is a discouraging one, needs no assertion to those who have tried it. Now, is not this the exact position of a large proportion of medical and dental students to-day, and especially of dental? This is not said with a view to discourage any laudable ambition. Far be it from me to do this. I would rather encourage every earnest effort to advance. While the profession was in its pupilage, this was not wholly detrimental; but now it is working a very great injury, indeed, is the drag that must land us in a wilderness of crudities, if a strong arm is not interposed to check it. Our colleges have done much, indeed, they have accomplished wonders, as is evidenced to your own comprehension, but they cannot do all. Now what are the facts? Men untrained in special studies, often with meagre education, enter our colleges and are met at the outstart with problems the most difficult, requiring a large amount of intellectual culture to comprehend, much more to master. They are overwhelmed at once. They are at the top and vainly essay to discover the beginning. The result is a constant floundering, through insurmountable difficulties until the end. Is it any wonder that men are turned out of colleges, good in practice it may be, and even passably good in theory, yet wholly unfitted to cope with that intellectual power, that is striding through all lands, and demands the fullest and completest attainment. There can be no remedy for this evil but a preliminary examination, thorough in its character and arbitrary in its demands. That this must come, whether this year or next, or a score of years hence, is certain, and only through its influence will we be relieved of the stigma of graduating uneducated men.

You can do much to help this sentiment in the profession. I am happy in the belief that the largest proportion of our graduates have been men

of sterling attainments; but it is only through the accidents of life that this is so. Many more have not been of this character, a misfortune to them as well as to their alma mater. I speak plainly, for the hour requires plain thoughts.

The subject of education is receiving more attention than ever before. The fearful war, now devastating and making desolate the homes of two nations, has had one good result amidst the fearful physical and moral destruction it has brought about, and that is, that it has opened the eyes of the whole world to the power of an educated people. Already the national legislature is ringing with appeals to make our education a subject of governmental care, and our State is looking toward compelling every parent to send the child to school. Is it not, then, proper and meet that we, in convention assembled, should earnestly take into consideration what will best advance our grade of scholarship, and give an impetus to our professional work? That it must be sooner or later done is plain to my mind, that it will be done is equally plain.

Should the time of study be lengthened?

I presume the necessity of this needs no argument. It is evident that our colleges are all lapsing into weakness by catering to the current American idea of rapidity of acquirement. The whole system is one of cramming from beginning to end, and while much is learned it requires the constant after training of years to digest that which has been secured. Superficiality is the bane of American life in all departments, and yet even in this land the boy apprentice to a mechanical branch cannot enter the position of a journeyman under five years pupilage, and this, perhaps, simply to give manipulative dexterity, brain work being mainly left for superiors. The dentist, however, is expected to acquire his profession in two or at most three years, and to become to some extent cultivated in many collateral sciences. His first duty is to perfect himself in mechanical dentistry. This is a combination of several branches, and alone should have a close apprenticeship of four or five years. This study will embrace an amount of knowledge from the collateral sciences, that will fully occupy the time allotted; but then we have operative dentistry also, that combines within its needs the skill of the artist, the knowledge of the anatomist, the coolness of the surgeon, and the keen insight into the causes and remote results of disease of the general practitioner. That this will require more time than is usually given must be conceded. Then if to these we add the necessary branches of study, anatomy, physiology, chemistry, materia medica, histology and surgery, the curriculum is beyond the management of any single individual in the time given. But these are not all. No dentist can be considered educated who lacks general information on all the sciences. He should have a clear idea of com-

parative, as well as general and special anatomy. If he is deficient in knowledge of the teeth of inferior animals, their general character and minute structure, how can he comprehend those he daily deals with? He cannot possibly. Yet how few there are who have any definite comprehension of the intimate relations existing between the structure of the teeth of all animal life. While it is the duty of the college to enter into this study, it can never be fully elaborated in the short time permitted the teacher. Thus I might analyse all the collateral sciences. Each in its turn may be made available for our purpose; if not directly, at least so far as to build up the whole man, and make a cultivated being fit to mingle with and take part with scientific men everywhere. When this is accomplished, then will dentistry receive the full meed of respect, and not until then.

That all this could be achieved in any ordinary pupilage I do not pretend to affirm. I am no advocate for very long periods of probation. I would prefer that an individual should receive the basis of an education and not the whole education; indeed, the latter can never be done. My own opinion is, that four years of college life would be the proper period, following a year of preparatory study in the laboratory. This would give five years of training, a time not too long to be burdensome to a young man willing to be thorough in every department. With such a course, the studies could be properly divided and the labors of the student condensed into digestible proportions. Are these utopian ideas? Not at all. They are fully carried out in Europe, where seven years are required for the study of medicine, following a most severe classical course, and this time is not spent in idleness. To each year is given a study; to one anatomy, another physiology, to another chemistry, and the end of the year must find the student competent to pass a severe examination in each to enable him to advance. At the end of his term he has another severe examination, covering the whole ground; and then a still severer one by the government, in which, if he fails, he is forever prevented from the practice of medicine. Is it any marvel that German science leads the world? If, therefore, we would ever aspire to an equal position, we must reform in this respect, and the sooner we comprehend the importance of this, in all its length and breadth, the more quickly will we be prepared to take measures for its accomplishment.

While in the adolescent period of our profession, immaturity of thought and a lack of attention to more theoretical branches could be overlooked, trusting to the future to cure the evils consequent upon it. Have we reached or are we nearing that future? It seems to me the answer must be clear to every mind that we have. Upon whom, then, devolves the work of regeneration? On you, most assuredly. To you belongs the

duty which became yours as part of that diploma, which you so earnestly worked for and so clearly earned. To mould the sentiment of a nation, to make a new path in the world of ideas, is the part of the profound, progressive thinker and worker, and marks the statesman above the mediocracy of his generation. Therefore, to us belongs the same duty, in a minor sense, towards the profession of which we are members. The work is one of magnitude, but difficulties to the morally courageous are but incentives to labor. The isolation of the graduate who settles in a remote section, surrounded by ignorant pretenders, may be imagined, but can hardly be realized. Shall we protect these? Shall the skill acquired by accurate training be wasted in vain endeavors to battle, single handed, this legion of ignorance? I trust not. The remedy, in part, lies at your doors. Organize everywhere in associations. Allow no man to enter who cannot show a diploma or submit to a thorough examination. Avail yourselves of your law makers, and secure the future if you cannot remedy the past. I am well aware that men of ordinarily good judgment are opposed to any legal force to remove this evil, and while, as a rule, I have more faith in the ultimate spread of intelligence, to arrest this wide spread quackery, I have still a belief that the innate depravity of man, or whatever you choose to call it, tempts him to continue in evil, unless superior forces lead into the path of good. At all events, we have the ripe experience of European nations to prove that such laws are of great value, if properly carried out. When a man knows there is but one road to reach the goal desired, he will set about to find that road; but if there be many, he will in all probability select that which seems the shortest, regardless of the many quagmires and obstructions he may meet with. This is human nature. Recognizing this, then, as a fact, our duty is plain. Laws of a stringent character must be passed, prospective and not retrospective. We cannot go back and say that every man in practice must submit to an examination; but we can say and must say, that no man in the future shall enter the practice of dentistry without a diploma from a regularly chartered college. This will not benefit *us* materially; but those of a half century hence will feel the full value of our exertions. You graduates of dental colleges can do this. On us this duty devolves, and woe be unto us if we are faithless to our mission.

There is still another duty devolving upon you. Support your dental colleges. See to it that they have that material aid that will enable them to carry their mission to its highest fulfillment. Give them the full weight of your moral support and sympathy. The difficulties, the anxieties, the severe labor that falls to the lot of the teachers in these, few know and still fewer appreciate.

There are many critics of instruction, but how few competent to instruct,

or if competent, are willing to sacrifice self for the good of others. That I believe colleges are imperfect you already know, and that they have performed a wonderful work for good cannot be denied. Give, then, the various Faculties your earnest support, and in the giving you will build still higher the temple dedicated to knowledge.

The hour in which we work is full of promise. Enlarged ideas of man's aims and destiny are taking the place of narrow bigoted views. The grand in human nature is overleaping the contracted selfishness of by-gone ages. Facts are recognized and mere theories discarded. Science, with her irrefutable logic, is scattering the twaddle of the past like chaff before the whirlwind. Men are becoming thinkers, and the more reason guides the helm, the more will the world advance. I congratulate you that in this hour of promise there is so much to be labored for. You know the path, follow it; and though you may not reach all that is desirable of attainment, the fact that your minds have wrought in the intellectual mine, and that you have labored to give the thoughts expression, will bring with it its own true reward. None of us may hope to be appreciated. The true worker never gives this a thought. The development of an idea is to him always self-sustaining. He can wait patiently for results, knowing that in the good time its truthfulness will be manifest. In the love, then, we bear our profession, by the hallowed memories of those who have past—by the interest of the living present, and the great needs of an unborn future, let us ever keep working, and the tiny seed will grow into the sapling and the sapling to the tree, and under its shadowy foliage we may end our years with the consciousness that we have not wholly lived and worked in vain.

THE GLYKOGENIC FUNCTION OF THE LIVER.

[Extracted from an Introductory Lecture to the Class of the Pennsylvania College of Dental Surgery, November 7th, 1870.]

BY JAMES TYSON, M. D., PROFESSOR OF PHYSIOLOGY AND MICROSCOPIC ANATOMY.

It has been customary to arrange the *phenomena* of *healthy life*, the consideration of which is the object of the science of Physiology, into two grand divisions, the functions or phenomena of *organic* life, and those of *animal* life, or the functions of relation. The former are common to all animals and vegetables, being those by which simple vegetative existence is maintained; while the latter, or animal functions, are peculiar and confined to animals, being the phenomena by which all but the lowest forms are distinguished from vegetables.

The *organic* functions include *Generation*, or the function by which the individual is reproduced, and the species preserved; *Digestion*, or the process of the preparation of food; *Absorption* and *Sanguification*, by

which the prepared aliment is introduced into the vessels, and converted into blood; *Circulation*, the function by which the blood is distributed throughout the economy; *Respiration*, through which the blood is aerated or acted upon by oxygen, and relieved of its carbonic acid; *Nutrition*, a still imperfectly understood process in which new material is laid down in the place of the old, which, in turn, is taken up and carried to the sewers of the body; *Secretion*, a process allied to nutrition, in which certain fluids and solids are separated from the blood, either to be used again as milk, or to be thrown out as useless or harmful, as the ingredients of urine; and finally *Calorification*, through which the uniform heat of the individual is maintained.

The *Animal Functions* or functions of relation are *Sensation, Voluntary motion, Mental and Moral Manifestations. Moral* manifestations are peculiar to man, constituting the cardinal characteristic by which he is distinguished from the so-called brute creation, to which must be permitted *mental* manifestations, at least in their general significance. But through his moral manifestations, man is enabled to conceive the Good, the True, and the Beautiful, and to comprehend also, the existence of a Supreme Being. These are conceptions of a highest intelligence, and by these man signalises himself rather than by a more perfect physical organization.

In all systematic treatises on Physiology, it is customary to take up these several functions, and consider them in detail; and such, indeed, will be the general method in this course of lectures. But so vast has become the amount of material at the disposal of the physiologist, that it would be quite impossible to state even all well-determined facts in the limited time allotted to lectures in the American system of medical education. So that a deviation from a strict observance of such a plan has become necessary in recent times, as the result of which it is found best to omit any effort at including all known facts of physiological science, but to confine ourselves to the demonstration of crucial matters; while it is attempted, also, to indicate to students the paths by which they can at once complete their information upon known points, and at the same time extend the boundaries of a science, the most fertile in unexplored treasures. To do this, we must seek a practical familiarity with the means which contribute most to this end.

The agents which have added most largely to our knowledge of physiological science are the *microscope* and *experiment*. The use of the former has been sufficiently illustrated in the preliminary lectures which I have given you in the past five weeks. I will not, therefore, occupy your time with any further consideration of it. But some of the results of the latter, I propose to illustrate in the course of the present hour.

For this purpose I have selected the *glykogenic* or sugar-forming function of the liver, which I hope to be able to demonstrate to your satisfaction.

In 1848, Claude Bernard, while seeking for the place in the body where the sugar derived from alimentary substances disappears, discovered sugar in the blood of the hepatic veins of dogs which had been fed for seven days exclusively on meat, and confirmed his results by repeated experiments. Thence he concluded, that sugar was formed in the liver, and was contained in the blood coming from that organ, independently of the diet of the animal. He also made extracts of the organ itself, and found it always contained sugar, while the other tissues of the economy were entirely devoid of it. Subsequently, he found it in the livers of nearly all animals, including man.

That sugar is not only present, but produced for some time after death in the dead liver is easily demonstrated. I have upon this plate a portion of dog's liver removed two days ago. It is therefore preëminently dead liver. Taking a part and rinsing it in cold water I cut it into smaller pieces, conveniently with a pair of sharp scissors, allowing the fragments to fall into this capsule of boiling water, to which an excess of crystallized sulphate of soda is added. After allowing the mixture to boil for two or three minutes the whole is poured into a mortar, compressed with the pestle, and then thrown upon an ordinary filter. The object of the sulphate of soda is to clarify the extract. The same thing is accomplished, though with more time and trouble, by filtering through animal charcoal. The filtrate is then a clarified aqueous extract of liver which is supposed to contain sugar. On cooling, abundant crystals of sulphate of soda deposit upon the sides and bottom of the vessel, but these do not interfere with the test. To determine the presence of sugar, I add, to a portion of this solution in a test-tube, a few drops of Fehling's* solution, a modified

*The following are the proportions to be used in making Fehling's Solution, taken from p. 147 of Dr. Roberts' "Urinary and Renal Diseases:"

40 grammes crystals of sulphate of copper,
160 " neutral tartrate of potash,
750 " caustic soda, sp. gr. 1.12.

Add water up to 1154.5 cub. centimetres.

Ten cub. c. correspond to 0.05 gramme of grape sugar.

It is well known that Fehling's Solution is liable to change on standing, so that if boiled, a precipitate takes place, even though no sugar is present. To obviate this risk, Dr. Flint prefers to make three separate solutions, which are to be mixed just before using, as follows —(Flint, Physiology of Man, Vol. III, p. 301:)

Solution of crystallized sulphate of copper, 90½ grs. in a fluid ounce distilled water.

Solution neutral tartrate potash, 364 grs. in a fluid ounce distilled water.

Solution caustic soda, specific gravity 1.12.

Take half a fluid drachm of the copper solution, add half a fluid drachm of the solution of tartrate of potash, and add enough solution of caustic soda to make three fluid drachms. Two hundred grains of this solution accurately made are exactly decomposed by one grain of sugar.

Trommer's test, and apply heat. Almost immediately after the boiling process begins, you note the reduction of the oxide of copper and the precipitation of the red suboxide.

This liver, then, undoubtedly contains sugar. Nor is this alone true. If a stream of water is passed through the portal vein, it will wash out the sugar there present, and if a piece of the organ be thus extracted and tested in the way I have shown you, it would not respond to the copper test. But if it be allowed to remain a few hours at rest, and then again tested, sugar will be found present, showing not only the presence of sugar in the liver, but that it is *produced* in this organ after death.

To prove, however, that the liver is a sugar-forming organ during life, something further is necessary; and Bernard further established the two following propositions, which I will also attempt to demonstrate: first, that no sugar is found in the blood of the portal vein of animals fed upon nitrogenous or non-saccharine and non-amylaceous articles; second, that sugar is found in the blood of the hepatic vein of these same animals.

In this test-tube I have an extract of the blood from the portal vein of the dog whose liver I have just tested, and which I prepared in a similar manner. Let us apply the Fehling's test. You note that the boiling point is attained, and that the process is continued for several minutes, and yet no reduction takes place. There is, therefore, no sugar in this extract of the portal blood. In the second tube, I have an aqueous extract of the blood taken from the hepatic vein of the dog whose portal blood we have just tested. I apply the same test, and you note the reduction which takes place of the protoxide of copper. Not nearly so marked, it is true, as when applied to the extract of the dead liver, but sufficiently so to satisfy us of the presence of sugar in this situation,—that is, in the blood coming from the liver.

Thus would appear to have been demonstrated the sugar-forming function of the liver. But the faith of many physiologists was for a time shaken by the results of the experiments of Schiff, Meissner, and Jaeger, of Germany, and especially of Pavy, of London, whose experiments were repeated with like results by M'Donnell, of Dublin. These experimenters declared that the liver did not actually contain sugar during life, but that the production of sugar was post mortem; that the liver produced, during life, the sugar-forming substance called by Bernard *glykogen* or *zoamyline*, but that the transformation of this substance into sugar did not take place in the living state, but after death.

These objections seemed at first well founded, for it can readily be shown that the living liver does not contain sugar. The dog which I now introduce has had nothing to eat for several hours. I propose removing in your presence, a piece of the liver, which shall be as nearly as possible

in the condition of the living organ, and without the administration of an anæsthetic, the use of which is attended by the appearance of sugar in the general circulation. The usual plan is to break up the medulla oblongata, but I propose here to administer prussic acid. A few drops of the strong acid are placed upon the animal's tongue, and in a few seconds, though not actually dead, he is beyond all suffering. Opening the abdomen and thorax quickly, the heart is seen to be still beating, the lungs expanding and collapsing. A piece of liver is rapidly cut out, rinsed in cold water, cut into small pieces in the capsule of boiling water, and treated as was the piece of the dead organ. The test liquid is applied, and you notice there is no response. The living liver therefore contains no sugar. What then is the state of the case? Does this prove that the liver is not a sugar-forming organ? Physiologists are, without doubt, indebted to Prof. Austin Flint, Jr., of New York, for the solution.

In September, 1869, Dr. Flint published a paper entitled "Experiments undertaken to reconcile some Discordant Observations upon the Glykogenic Function of the Liver," as the result of which he concluded that sugar is constantly formed in the liver but is discharged into or washed out by the blood of the hepatic veins. In an experiment performed before the class of the Bellevue Hospital Medical College by Prof. Flint, January 4th, 1869, upon a medium sized dog in full digestion of meat, the medulla oblongata was broken up; the portal vein was tied through a small opening in the abdomen, the abdomen then widely opened, a portion of the liver excised, rapidly rinsed and cut up in boiling water—the length of time between the breaking up of the medulla and cutting up the liver being one minute. The vena cava was then tied above the renal veins, the chest opened, and the cava again tied above the hepatic vein. Blood was then taken from the hepatic veins, an equal bulk of water added, with an excess of crystallized sulphate of soda, and the mixture boiled. A portion of the portal blood and the decoction of the liver were then treated in the same way, and the three specimens filtered. The clear extracts were then tested with Fehling's liquid, with the following result: There was no sugar in the portal blood, none in the extract of the liver. There was a *marked reaction in the extract of the blood from the hepatic veins*, the precipitate rendering the whole solution bright yellow and entirely opaque.

Our experiments to-day have sufficiently confirmed these results, and though they would seem amply conclusive, Dr. Pavy replied to Dr. Flint, "that so quickly is sugar formed in the liver after death that the result was to have been expected, considering the expenditure of time involved in applying the ligatures." This objection can, of course, only refer to the presence of sugar in the hepatic vein, since the results of Dr. Flint's

experiments, as well as the one performed before you to-day, coincide with those of Pavy as to the absence of sugar in the living organ.

We believe the question to have been definitely settled by the recent experiments of Prof. W. T. Lusk, of New York City, whose paper "On the Origin of Diabetes" is contained in the New York Medical Journal, for July, 1870. Dr. Lusk's experiments consisted *first*, in the removal of blood by catheterization from the right side of the heart, and from the jugular vein; *second*, in testing with a carefully diluted Fehling's solution the alcoholic extracts of these bloods. The results clearly showed that the quantity of sugar in the right side of the heart was two to four times greater than that found under corresponding circumstances in the jugular vein, and from this he justly concluded that there was by no means an insignificant amount of sugar in the pure hepatic blood, before it has become largely diluted with the comparatively non-saccharine fluids of the venæ cavæ, and thence that the liver "is certainly, under normal conditions, the principal source of sugar in the economy."

These observations, then, would lead us to accept the conclusions of Prof. Flint, Jr., as apparently confirmed by the demonstrations of this lecture, but especially by the crucial experiments of Dr. Lusk. Our own conclusions are, then, those of Prof. Flint, which we accordingly append from p. 315 of his third volume, that including "Secretion, Nutrition, Movements."

1. "A substance exists in the healthy liver which is capable of being converted into sugar; and inasmuch as this is formed into sugar during life, the sugar being washed away by the blood passing through the liver, it is perfectly proper to call it glykogenic or sugar-forming matter.

2. "The liver has a glykogenic function, which consists in the constant formation of sugar out of the glykogenic matter, this being carried away by the blood of the hepatic veins, which always contain sugar in a certain proportion. This takes place in the carnivora as well as in those animals that take sugar and starch as food; and it is essentially independent of the kind of food taken.

3. "During life the liver contains only the glykogenic matter and no sugar, because the great mass of blood which is constantly passing through this organ washes out the sugar as fast as it is formed; but after death, or when the circulation is interfered with, the transformation of glykogenic matter into sugar goes on; the sugar can then be detected in the substance of the liver."

It should also be stated, that the animal from whose portal and hepatic blood were made the extracts used in this lecture, was placed under the influence of an anæsthetic, the objection to the use of which has been

alluded to. But since the comparison was made between the portal blood going *to* the liver, (which alone could obtain sugar, on the supposition that nitrogenous food only is used, from the systemic blood through the cœliac axis and superior mesenteric artery,) and between the same blood passing *from* the liver, and since the former was found *not* to contain sugar, we do not think any valid objection can be made to the use of ether. In analyses of blood obtained from the cavities of the heart, the omission of the anæsthetic is more essential.

FUSIBLE ALLOYS.

BY JAMES LEWIS, D. D. S.

The field of fusible alloys is a large one, and undoubtedly there is much yet to be developed in it to serve purposes of utility in directions as yet not contemplated. So far as relates to the requirements of the dental profession, it does not seem to me that we can hope for a very decided increase of advantages by making extended experiments for the purpose of perfecting alloys fusible at a low temperature, to be used as bases for artificial dentures.

Tin forms the principal ingredient in all the compounds now in use for the purpose under consideration. By itself, this metal lacks several important requisites, the partial attainment of which suggests the addition of other metals. There are several metals that may be combined with tin to increase its hardness, and in a very slight degree its elasticity—two essential qualities in which tin alone is wanting. In my experiments, having in view an alloy for bases for teeth, I have been restricted to the use of a limited number of metals. Lead can scarcely be permitted in the mouth on account of the poisonous nature of its salts, and the readiness with which they might be expected to be formed when an alloy containing that metal is placed in contact with vitiated secretions in the human mouth. The same objection may measurably be urged with regard to antimony, copper and mercury, all of which metals are sometimes used in the formation of alloys in which certain modifications are required, some of which might be desirable in fabricating dentures, if the objectionable qualities incident to those metals could be overcome. My experiments, for reasons that are suggested above, have been confined to alloys embracing tin, cadmium, zinc and bismuth. I have noted some peculiarities in the compounds I have formed, most of which indicate negative results. In other words, I find more to find fault with than to commend. I find that tin alloyed with more than two per cent. of bismuth becomes

objectionably brittle. No modifications of any compound of tin and bismuth, containing more than two per cent. of the latter metal, is susceptible of any important improvement as regards brittleness by the addition of unobjectionable quantities of zinc or cadmium. With two per cent. of bismuth added, the hardness of the tin is not sufficiently increased to indicate the least advantage in using bismuth as a constituent of an alloy for "bases."

With zinc a greater percentage may be employed before we arrive at the point at which brittleness becomes a conspicuous feature. Ere this point is reached, however, other conditions are developed which are decidedly objectionable. In cooling, the alloy crystallizes in somewhat coarse granular crystals, which display themselves conspicuously on the surface of the alloy. When the quantity of zinc is not very great a slight modification of the tendency to crystallize in large crystals is effected by the addition of cadmium. Still, while the alloy possesses the requisite qualities of hardness and freedom from brittleness, the process of crystallization inevitably tends to produce an uneven surface in some places, marked by pits, in consequence of the shrinkage of the compound in cooling. Thus far I have seen no alloy free from this objectionable feature. Nor have I seen any alloy possessing sufficient *elasticity* to permit the construction of bases in which that quality might be desirable. But in cases where weight and stiffness are allowable, we may consider the fusible alloys, or at least the least objectionable of them, advantageous and not undeserving of our attention.

A specimen of a popular alloy that recently came into my hands has a peculiarity of surface, such as I have noticed only in *amalgams* formed by heat. I submitted small samples of this alloy to a few comparative tests with similar samples of alloys I had made while prosecuting experiments. I found that in contact with silver it gave a stronger indication of galvanic action, when in contact with the tongue, than samples of my own alloys, in which the percentage of zinc was near the maximum without producing brittleness.

Experiments with reference to the effect of the introduction of mercury satisfied me that the addition of this metal may be made with marked improvement in the *appearance* of an alloy without detriment to its hardness and tenacity. Not having tested the alloy alluded to for mercury, I have at present only a *suspicion* that mercury is one of its constituents.

Whether the addition of so much mercury as would improve the physical properties of an alloy would form a compound that would prove deleterious in the mouth I am as yet not prepared to say. On the other hand,

I am, like most of the profession, just enough prejudiced against an unnecessary use of mercury in the human mouth to feel unwilling to fabricate an alloy containing it to be used as a base for dentures.

While I disclaim any design of creating a suspicion in the minds of the profession as to the properties of the materials they use, I would be glad to have the subject fully investigated as to the utility or advisability of employing mercury in the fabrication of such alloys as are desired by the dentist. We know that fusible alloys, in which mercury is an element, have been urged upon the profession as suitable materials for plugs. I have no doubt such alloys may be used with as much safety as amalgams, against which a majority of the profession have a prejudice, based upon very legitimate but not invariably correct reasoning.

In the preparation of alloys, as in the fabrication of rubber compounds, the experimenter must necessarily be limited by the capabilities of the materials he uses, beyond which he cannot go. In the attainment of some one apparently desirable quality there must be sometimes a sacrifice of some other desirable quality, and as a matter of unavoidable *necessity*, perfection can only be approximated, even distantly.

While prosecuting some of my experiments with alloys, it occurred to me that in all probability the union of metals in *atomic proportions*, or in multiples thereof, might possibly produce better results than if no attention were paid to the "combining weights." I do not feel assured, however, that I have detected any advantages in this treatment.

Without entering into details or calling attention to experiments I have made, I may invite attention to certain facts which possibly may explain a suggestion I embodied in my remarks upon the *capabilities* of materials. It will be seen that the *qualities* sought in the proposed alloys for "bases" are hardness, elasticity, toughness, purity of color, and freedom from chemical action. None of the individual metals that we can use in the fabrication of the desired alloys have more than one or two of these qualities. One of those, elasticity, is not a characteristic of any of the available metals that can be used. Nor can it be secured by any combination of two or more of them. We have, then, to content ourselves with a *moderate* degree of hardness, a *moderate* degree of toughness, a marked degree of inelasticity, and only a delusive hope of freedom from chemical action. I confess my inability to offer any very valuable suggestions which will increase the sum of our *useful* knowledge of fusible alloys for artificial dentures.

MOHAWK, N. Y.

MINUTE STRUCTURE OF AN AMALGAM-FILLED TOOTH.

BY S. P. CUTLER, M. D., D. D. S.

This tooth, lower second left bicuspid, decayed on posterior approximal surface, and extending over half of grinding surface, but not quite reaching the nerve, had been filled six months, and had given no trouble until a short time ago, when it became painful and somewhat elongated—pain experienced on occlusion of jaws for the twenty-four hours previous to its removal. The tooth never gave any trouble until a few days before extraction. The young man is about twenty-one years old, of nervous temperament, a clerk in a store. The fang of the tooth, about half way up from apex, presented that peculiar hyaline, or translucent appearance, usually witnessed in old age and in loose teeth, showing, more or less, closing of tubuli, and, more or less, secondary ossification of pulp cavity. It also had a long fang, rather crooked, firm in socket; none of the teeth missing on that side, though many of them were filled with gold and one molar with amalgam. This last at first was supposed to be the offender. The filling was removed, which gave entire relief to that tooth, but soon the pain reappeared with renewed energy in the tooth under consideration. On splitting open the tooth the crown portion of the nerve was found to be in a suppurating condition of recent origin, extending into the neck. The balance was only inflamed.

MICROSCOPIC APPEARANCES.

A central longitudinal section gave the following appearances: On the side of pulp cavity, occupied by the plug, secondary dentine had progressed inwards and downwards to a considerable extent as far as the alveolus, becoming gradually narrower, and finally ceasing by gradual taper to the opposite side of normal cavity—the secondary formation passing more than half around the cavity. The dentine over this region, up to decayed surface, translucent, similar to fang, with the usual characteristic change in tubular structure, though not so marked. The balance of crown normal, only the surface of decay which was not entirely removed in excavating, though no signs of decay going on. For a short distance, so far as the discolored *dentine* extends, there is the usual characteristic buccated or beaded appearance in tubuli, not caused by reason of mercury, as that is a common appearance of decayed dentine. I could discover no signs of mercury in tubuli whatever, or any original defects in the dentine. The pulp cavity of fang, to the extent of secondary change, as mentioned above, presented the usual secondary dentification from apex up to about the middle. On all sides about equally narrowing the canal, showing the peculiar irregularities of secondary dentinal tubuli, so often referred to in my former articles. The cement on one side of the fang was hyper-

trophied up to the middle, or as far as the change in the primary dentine and secondary limits. The usual bone structures of the cement somewhat changed the canaliculi, being less distinctly marked. My object in writing this article is to show the effects of filling where the decay is extensive and nerve nearly exposed and sensitive. This tooth had the white form of decay, as I was informed by the operator who filled it. Under the filling, the tooth cavity was dark and firm, the amalgam filling also being dark but sound; dark from oxidation, no doubt. There was a portion of the white softened dentine left intentionally over the nerve as a protection, or rather to avoid exposure of nerve from too much excavating. The oxidizing of the amalgam, no doubt, caused the darkened appearance of the dentine, and arrested any tendency to further decay from therapeutic influence. I examined closely to see if there was any traces of quicksilver in the tubuli or surface of decay or nerve cavity, but failed to find any.

Now, the question is this: is it possible, even where the pulp is dead, for the vapor of quicksilver to enter the minute tubuli by force or *osmose* action, or any other way, as there seems to be no adhesive affinity between the mercury and dentine to allow of what is termed *welting?* This is governed by certain affinities, that is, if the adhesive attraction between a liquid and solid exceeds one-half the cohesive attraction of the liquid, then welting takes place, otherwise not. Now, mercury and gold, silver and tin, possess this property, and if the tooth was composed of similar materials the mercury would readily pass into and through the tubes, if open; but there being no such affinity, no mercury could be found in dentinal tubes. Water will readily enter dentinal tubes, as the requisite affinities there exist. These fine capillary tubes may be supposed to absorb on the same principle as welting. Mercury, glass, porcelain, and some of the metals possess no such affinities. Many other bodies might be also named. Mercury will even dissolve gold, silver, tin and other metals, and when this takes place the *affinity* goes still further than that of welting, and is explained in this way: When any solid body is dissolved in a liquid, or forms a solution, the adhesive affinity between the solid and liquid exceeds the entire affinity of cohesion of the fluid atoms. What are the facts in relation to the tooth under consideration? This tooth had lost a large portion of its crown by decay, which was restored by an amalgam filling. This being a foreign body to the tooth, imparted its shocks through its conducting power, which being abnormal to the tooth, caused disturbance to its myriad of nerve fibrils, weakening their powers of vital resistance by slow degrees. As the vital resistance ebbs, the mineral encroachments march on apace, that is, as the vital integrity lowers, the circulation in the part

becomes lessened or stagnated. In consequence, there would be more time allowed for the mineral salts, as lime, to infiltrate into the now enfeebled tissues, and there remain a sufficient time to permit absorption to take place. In this way a nucleus is formed in the pulp substance, which serves, in turn, to attract more atoms around it and continues to grow, similar to the formation around the teeth, forming nodular dentine. But in the above case I found no nodules in the pulp, as I might have expected; on the contrary, I found precisely the same state of things that always takes place in old age, though in a much more hurried manner. In the one case, perhaps, an effect, and in the other, a cause, of lessened vital resistance. This effect, reacting and serving equally as a cause in both cases, bringing about the same results. This, though not yet a settled fact, may answer us as hypothesis, and may ultimately prove a correct theory. In the case cited above, there was of necessity great destruction of nerve fibrils, from the extent of decay lessening the sum total of vital resistance, at least throughout the substantia eburnia, or dentine, allowing the growth inwards in tubes and pulp cavity as already given above. Why the same effect did not take place throughout the entire tooth is not so easily accounted for, as this same partiality is recognizable in all similar cases from whatever cause. Even the changed dentine is not uniform in its character, the portions unchanged always presenting the usual normal appearance, only more yellow in advanced agé. In all such cases the tubes are narrowed, more or less, throughout, as well as the entire pulp cavity. At what precise time this process commenced in the above tooth is not easy to determine. It may or may not have commenced before filling, though, from the numerous observations I have made in teeth similarly decayed, I am led to believe the change took place after filling. How much depended on the influence of the mercury I cannot say, neither can I say that gold would have done any better, or even tin: each might be governed by relative conducting powers. Whether the battery influence of the amalgam had any agency in the process, must be decided by more extended observation. It is possible that some non-conducting substance, such as gutta percha, or Hill's stopping, used as a filling, or as a capping under a metallic filling, would offer greater protection to the beleagured pulp beneath. Os artificial is a non-conductor, but on first application is irritating, from the action of the hydrochloric acid on the lime of the tooth. The greater affinity of the acid for the lime, than for the zinc, decomposes a superficial layer, and in consequence renders that layer chalky. This becomes manifest through the enamel when in contact with it. This I propose to remedy by first introducing styptic colloid into the cavity on cotton and letting it remain a few moments, then remove the cotton, and by the

time the os artificial can be introduced into the tooth the ether is evaporated, leaving an impervious coating which the acid has no power to act on, in this way permanently protecting the lime of the tooth. Non-conductors also have their objections, as in the case of rubber plates. In gaining one point we may lose another, so that we have much to learn yet on the subject of fillings in large cavities. Os artificial, like every new lion in the arena, needs taming before it can be regarded as perfectly harmless under all circumstances.

In the above case there might have still been a chance for healthy action in the process of secondary dentification, could the process have been conducted a little slower, so as to have allowed sufficient time for pulp absorption, so that it could have been removed out of the way in time, and not have been too much crowded in among delicate nerve fibrils, causing inflammation and its consequences as above named.

The other day I extracted a molar for a young man which was decayed nearly to the nerve and aching. On splitting it open I found the bulb, or pulp, nodular, and no signs of inflammation. The pulp had a white appearance, and was unusually dense and plump throughout. Where the nodules were not, it was evidently thoroughly saturated with lime salts, so much so as to prevent any undue distinction of vessels and consequent inflammation. This tooth ached from pressure of earthy matter among the nerve fibrils, though not of an acute character, as in cases of actual inflammation of pulp. In a short time the entire pulp must have become ossified and ultimately subsided into quietude. The investing pericementum was inflamed, which was another source of trouble. All such teeth possibly could be saved by proper treatment, by assisting nature a little in her difficulties. This is only one, out of a great many that I have examined that were in a similar condition, that I might mention. I am not aware that other writers have paid much attention to this condition of pulp but only the nodular condition. This saturation of lime salts I have been studying carefully for some time, with a view to restoring such teeth, when troublesome, to a healthy condition. This is in many cases practicable, where the patient is manageable, or willing to wait and endure for a time a little inconvenience. There may be skeptics on this question, as well as on all other unsettled points, but they are generally investigators and open to conviction. My ideas concerning the cause of this condition of pulp have been repeatedly given to the profession, but I will recapitulate a little. In the first place, there must be a weakening of vital resistance in the part before any such encroachments can occur. Then a stasis in the circulation takes place from want of capillary integrity of function; or, in other words, *defective pronounce-*

ment on their part, owing to neural or vital weakness, as the capillaries have a special function to perform. After stagnation in the vessels for some time, the lime salts begin to osmose into the extra vascular tissue, and thereby, desiccating or drying, they begin to thicken and ultimately harden into nodules, sometimes filling the entire pulp, as in the case cited above, and by their pressure forcing the blood-vessels to deplete themselves, and by pressure pain is produced.

In the treatment of such cases, in the first instance, we must restore vitality to the pulp, which may be done by local stimulants of various kinds, including galvanism. This may be readily applied. At the same time weak vegetable acids might be used on cotton sealed up in the cavity. The acid should not be strong enough to decompose the dentine. This may be alternated with carbolic acid, creasote and various other agents. The object of the acid treatment is to dissolve out the soft solid lime salts from pulp: vinegar will do for this purpose. These ideas are suggestive only, not being based on very extensive experience with such teeth in the mouth, but outside with favorable results. 1 have treated many teeth successfully where I believed this acidifying process was going on; I have one of the kind in my own mouth, which gave me trouble, though not decayed. We often see cases in young subjects, where the teeth are very much crowded and lapped, causing trouble from pressure one on the other sufficiently to cause nodulation.

We often cap and fill teeth where there is slight exposure, sometimes with success and at others with failure and subsequent death of pulp. Most of the successful cases, sooner or later, undergo ossification of cavity or pulp, or both, to a greater or less extent. Sometimes such cases, from hurried action, are lost, when they might be saved by filling.

The lime salts, previously mentioned, after saturating the pulp, more or less, from pressure, drives the blood slowly and gradually out of the tooth, the salts taking the place of the blood in the vessels as the blood leaves them, and the entire pulp becomes differentiated into secondary dentine. The nerve fibrils alone resist this process, and in some cases succumb under the extent of earthy influence and suffer more or less ossification, the pressure causing their absorption.

One very remarkable and noticeable feature in the pulp of an aching tooth, where it is saturated with the earthy salts, is a total want of all signs of inflammation in such pulp, even where only a portion is saturated, which has a chalky feel and appearance. This chalky appearance always precedes nodulation. When this is perfected, the noduli becomes translucent, and lose the white appearance. In a few exceptional cases the pulp remains perfectly white.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

SURGICAL CLINIC OF PROFESSOR MEARS.

Since the report in our last issue, the surgical clinics have been held each Wednesday, as announced, and a number of patients have presented themselves, illustrating in their cases the various forms of disease and injury discussed in the didactic course of lectures.

In order to secure the attendance of patients, and to maintain the interest in the clinics, it has been deemed advisable to continue them during the entire year, with the exception of the months of July and August. The resident Alumni, and the students and friends of the College, are invited to attend, and their active co-operation is solicited in the development of this important feature of the course. The interest manifested in the clinics by the students during the past session has clearly demonstrated their appreciation of them, and the advantage to be derived from their fullest development.

January 4th, 1871.

You will recognize, gentlemen, the young man before you to-day as the same who presented himself December 8th, 1870, suffering from an alveolar abscess. He comes to-day in order that you may note the results of the method of treatment adopted in his case, and also to terminate the necessary treatment by having extracted the roots of the second molar tooth of the lower jaw, which, you will remember, we designated as the remote cause in the production of the abscess. By reference to the notes of this case, you will find it recorded that the roots could not be extracted when he first presented himself, by reason of the fact that the inflammatory action had involved the parts so extensively as to produce closure of the jaws. This condition is removed by the subsidence of the inflammation, and the offending fangs can now be readily reached. Your attention is called to the condition of the bone at the point corresponding to the alveolus of the second molar. In passing the finger over the body of the bone, externally, there can be detected a marked prominence, which is due to a deposition of ossific matter, combined with a thickening of the periosteum around the opening made by the pus as it forced its way through the external wall of the alveolus. This ossific deposit, or callus, as it is technically called, was deposited at this point as the result of the inflammation excited in the periosteum, and in the bone itself to a certain extent, and corresponds, in all particulars, to that which is formed about the ends of fractured bones. In the course of time this deposit will be removed by absorption, and the bone will resume its normal shape. You will also observe that the cicatrix, resulting from the incision made in opening the abscess, is concealed from view; in making the incision,

this fact was taken into consideration, and the result is such as we desired. The roots of the tooth were extracted by a member of the class, and gave evidence of having been the seat of inflammatory action.

Another patient presents himself to-day in order that you may observe the progress made in his case, and the effect produced by the operation which was performed. At a recent clinic an operation was performed for the removal of a large portion of the left superior maxilla, which had been attacked by necrosis following the extraction of several teeth. The presence of the sequestrum maintained a constant discharge of pus, which, acting as a drain upon the system, had materially impaired his general health. Soon after the removal of the dead bone the discharge ceased, with the exception of a very slight quantity, which came from a point near to the opening between the cavity of the antrum and the nose. On examination, a small spicula of bone was found imbedded in the tissues, and this, acting as a foreign substance, produced suppuration. After its removal, the discharge entirely ceased, and the parts rapidly healed.

You will remember the remarks made at the time of the operation in reference to the character of the repair which ensues upon a loss of substance in the superior maxilla. It was then stated that, in these cases occurring in the adult, the periosteum makes no effort at repairing the loss which has taken place. This statement is verified in the case before us, for you will observe, on examination, that although the periosteum has been carefully preserved, no osseous tissue has been formed. The superior surface of the cavity, left by the removal of the necrosed bone, is formed by the roof of the antrum, (its floor and external wall having been removed,) and it is covered by its normal mucous membrane, which is much thickened by reason of the inflammation which invaded the antrum subsequent to the involvement of the alveolar process.

This failure on the part of the periosteum of the superior maxilla to reproduce bone is a remarkable exception to the general rule, which governs its action in other parts, and thus far remains without satisfactory explanation.

This case has progressed very satisfactorily—the parts are in a good condition, and the general health of the patient is much improved. He is somewhat annoyed by the passage of fluids from the mouth into the nose through the opening which exists between the cavity of the antrum and the nose—this opening is, as you see, quite small, and its size will be further diminished by the contraction of the surrounding tissues. When the parts are in proper condition he will have adapted an artificial denture, made so as to fill up the cavity, thereby occluding the opening, improving his speech, and removing the slight deformity which now exists.

Later in the session an artificial denture was adapted by Dr. J. M. Barstow, the Demonstrator of Mechanical Dentistry, which fulfilled the indications presented in every particular, and gave the patient entire satisfaction. His health was greatly improved, having gained nine pounds in weight in six weeks' time.

January 11th, 1871.

The case of necrosis of the superior maxilla, which has been under our observation recently, has afforded us, gentlemen, an opportunity of studying, in connection with the primary involvement of the alveolar process, disease of the cavity of the antrum. On a former occasion we considered the subject of growths within the antrum, directing our attention more especially to tumours originating in the cavity. The form of disease presented in this case is classified among the cystic diseases of the antrum, and is designated as *suppuration in the antrum, or abscess.* Before entering upon the consideration of this condition, it will be interesting to examine into the anatomical relations of this cavity. Although its existence has been known from an early date in the history of anatomical investigations, it did not receive very careful study until the efforts of Highmore inseparably associated his name with the cavity, so that it is known and described in systematic works as the *antrum of Highmore.* It was described by him as "conical and somewhat oblong," and the drawings with which his work was illustrated were made to conform to this description. It is now more correctly described as a "large triangular-shaped cavity, with apex directed outward, and formed by the malar process, its base by the outer wall of the nose, its roof by the orbital plate, and its floor by the alveolar process." Anteriorly, it is bounded by the facial surface; posteriorly, by the zygomatic. Its base presents a large irregularly-shaped opening, which, in the articulated skull, is almost entirely closed by articulation with the ethmoid above, the inferior turbinate below, and the vertical plate of the palate behind. By means of the small aperture the cavity of the antrum communicates with the middle meatus of the nasal fossa, and through this opening the mucous lining membrane of the nasal fossa is prolonged, and becomes the lining membrane of the antrum. It is important for you to understand the size and position of this opening, for you will observe, as we continue the consideration of the case before us, that a knowledge of its position may be of value in determining the extent to which the cavity is involved.

According to Mr. Cattlin, (Transactions of the Odontological Society of London, Vol. II,) the examination of a hundred specimens showed the cavity of the antrum to be larger in the male than in the female, and gave the average size to be that capable of containing two drachms and a half of fluid. Much variety of size and configuration exists in the antra.

Frequently they are unsymmetrically developed, one being larger than the other. Often the cavity is found to be sub-divided by bony ridges, and sometimes it may extend into the malar process, forming a cavity there.

Projecting into the floor are the conical processes, which correspond to the roots of the first and second molar teeth. Sometimes the thin lamina of bone, which normally covers the apices of the roots of the first and second molars, is wanting, and the teeth are therefore in direct communication with the cavity. This fact will explain to you the readiness with which inflammation affecting these organs is imparted to the lining membrane of the antrum; in truth, the normal thin osseous lamina opposes but a feeble barrier to the extension of disease, implicating, as you witness it in this case, the alveolar process.

Having studied the anatomical relations of the cavity, let us proceed to the consideration of those affections which are described as cystic diseases of the sinus. These are designated as *suppuration in the antrum, or abscess*, and *hydrops antri, or dropsy of the antrum.*

Ordinarily, the cause of the former can be directly traced to diseased conditions of the teeth in relation with the cavity, through which inflammation is transmitted to the lining membrane of the antrum, and, progressing without interruption, eventuates in suppuration. Occasionally it happens that an abscess may form in the alveolus, and burst into the antrum, although connected with teeth not in relation with the cavity. Such appears to have been the fact in this case, for you will recall the statement of the patient, that he located the trouble originally in the alveolus of the first bicuspid tooth. Other causes are enumerated as concerned in the production of this condition, such as violent blows upon the cheek, pressure occurring during birth, catarrhal inflammation, and the entrance of a foreign body into the cavity.

The symptoms of abscess are such as indicate the beginning stage of inflammation—dull, deep-seated pain over the region of the cavity, and extending to the forehead and temporal fossal, with swelling and tenderness of the affected side of the face, accompanied by more or less febrile movement and constitutional disturbance. If the inflammation is permitted to progress, the suppurative stage soon supervenes, and the sinus becomes distended by the accumulation of pus, which may escape, when the cavity is sufficiently full, through the naso-antral (if we may be allowed to so designate it,) opening. If this does not occur, and it is described by authorities as rarely happening, the distention increases, the walls are bulged out, (becoming thin by the process of absorption which takes place,) encroaching upon the cavity of the orbit above, or forcing out the anterior wall. The pus, if not evacuated, forces its way through the thinned bone, and escapes by the side of the teeth, through the front wall,

or possibly through the orbital plate. In these cases considerable destruction of bone occurs, and the soft tissues are marked by an unseemly cicatrix. Very serious results are liable to follow involvement of the cavity of the orbit, by reason of the extension of the inflammation to the structures of eye, producing, as is recorded in some cases, permanent amaurosis. The inflammation may, indeed, extend beyond the orbit into the cranial cavity, and death ensue as the result of inflammation of the brain, or its membranes. A case of this kind is reported in the *Edinburgh Medical Journal* for 1866, by Dr. Mair, of Madras, and is incorporated in the excellent work of Mr. Heath on the Diseases and Injuries of the Jaws.—(Appendix, Case XII.)

The *diagnosis* of suppuration in the antrum is not usually attended with much difficulty, the rapid invasion of the disease and the character of the symptoms pointing clearly to the location of the affection. When the cavity is filled with pus and the distended walls thinned by absorption, a peculiar crackling sound can be elicited by pressure, which may be accepted as diagnostic. In the case under consideration, you will remember that the escape of pus from the nose was the symptom which induced the dentist to pronounce the disease as located in the antrum. In order to make this fact valuable, in a diagnostic point of view, it is essential that the nasal fossa should be subjected to careful examination in order to determine its freedom from disease.

There are several forms of chronic suppuration occurring in connection with the teeth, the bone and the antrum, which, by reason of the slow expansion of the jaw which attends them, may be mistaken for solid growths. In some of these instances extirpation of the bone has been undertaken through error in diagnosis.

As suppuration in the antrum so frequently results from diseased teeth, the first indication to be fulfilled in the *treatment* consists in the prompt removal of all carious teeth or roots in the affected jaw. Those teeth which are apparently sound should be tested by a sharp blow with some metal instrument, and if found at all sensitive should be promptly extracted. This treatment, combined with fomentations and leeching, may frequently stay the further progress of the inflammation. If pus has been formed its early evacuation becomes a matter of paramount importance, and should be accomplished by the extraction of a molar tooth, and the passage of a trocar through one of its outer sockets. Mr. Salter advises, in case that the teeth are all sound, the selection of the first molar for the purpose, and he gives as his reasons the facts that the alveolus is deeper and that it presents a greater liability to decay than the other teeth.

If it is thought advisable, the cavity of the antrum can be evacuated

by perforating the wall above the alveolar border. The objection to this plan is that the drainage cannot be well maintained.

After evacuation of the cavity it is highly important that it should be well cleansed, and this can be accomplished by means of a curved canula adapted to an ordinary syringe. With this the cavity can be thoroughly washed out with warm water, and afterwards the lining membrane treated by the injection of medicated lotions. For this purpose carbolic acid, permanganate of potassa, chlorinated soda, in proper strength, or astringent preparations containing the sulphate of zinc, &c., may be employed. The opening into the cavity should be kept plugged in order to prevent the entrance of particles of food which would serve, if admitted, to maintain the inflammation.

The other cystic disease of the antrum, to which your attention is directed, is that known as *hydrops antri*, or *dropsy of the antrum*, as it is commonly designated. The symptoms of the affection are those which mark a gradual dilatation of the jaw, characterized by an entire absence of the phenomena of inflammation. The pressure exerted by the gradually accumulating fluid acts upon the walls of the cavity so as to force out the anterior wall, depress the palatal vault and occlude the nasal fossa by the bulging of the internal wall. The extraction of a molar tooth and perforation through its socket, gives vent to a clear or yellowish serous fluid, frequently containing flakes of cholesterine. After removal of the fluid, the cavity contracts, the opening made in perforating the alveolus closes, and the bone resumes its normal relations. This constitutes the *treatment*. The *diagnosis* of this affection is not difficult—the gradual and painless character of the swelling, conjoined with the crackling sensation imparted to the fingers on making pressure, are sufficiently diagnostic in their nature.

An interesting point in the consideration of this disease relates to its pathology. Formerly, the accumulation of fluid in the cavity was accounted for by the supposed closure of the opening between the antrum and the nose, by reason of which the mucous secretion, which was thought to be constantly formed by the lining membrane, was prevented from passing off. In accordance with this view, an operation was recommended for re-opening the orifice by means of probes, and subsequent treatment of the condition by injections. Later investigations, based upon the examinations of the fluid found in these cases, showed that this view of the pathology of the disease was incorrect, since the composition of mucus and the contained fluid differed materially. On analysis it was found to resemble closely the fluids contained in cystic growths, and hence it was inferred that the disease originated in the development of cysts within the antrum, or in connection with the roots of the teeth.

Editorial.

DENTAL COLLEGES.

The period of instruction in our Colleges having closed and the commencements held, it is with gratification that we are able to report full classes. By reference to the report of the Pennsylvania College, it will be observed that the usual number of students took advantage of the instruction there offered. It is evident there has been no diminution of the interest in collegiate instruction in the profession, but, on the other hand, a marked increase, judging by the numbers matriculated here and elsewhere. To us this is full of encouragement, as it evidences an increasing healthy sentiment that must result in obliterating the old and most defective mode of dental instruction.

If dentists everywhere would earnestly co-operate with the Colleges, the stigma of quackery would soon be banished from our ranks. It is folly to undertake to shift the blame of our own shortcomings on vulcanite and amalgam so long as a feeling of jealousy or of fault-finding with these institutions is allowed to prevail. Criticism is valuable when conducted in the right spirit, but when it evidently proceeds from narrow-minded prejudice or an overweening self-conceit, it operates only to the injury of all concerned.

That Colleges fall far short of what all hope for is certain: but this is true of all human endeavors. The question simply is, are they the best means attainable for the accomplishment of the end in view. We have no hesitation in answering affirmatively. More than this, they are not only the best but the *only means* whereby a student can become fitted to practice the profession. It is too late to urge the possibility of any one preparing himself in the laboratory for practice without the additional benefit of college instruction. The advancements made in science require an enlarged education. This can never be given by *one man*, but must be by the combined efforts of many. The indications are that we are approaching a radical change in educational processes. That there is great room for improvement all must admit. To accomplish this, all hypercriticism should cease, and in its place an earnest co-operation must be felt and shown with those who are striving to elevate the profession.

PENNSYLVANIA STATE DENTAL ASSOCIATION.

We would ask special attention to the call for the annual gathering of the Pennsylvania State Association, to be found in another part of this journal. It is to be hoped that this meeting will be fully attended. The

importance of keeping up such organizations, whether State or National, cannot be over-estimated. Many are disposed to regard them more in the light of social gatherings, without much real benefit in the way of scientific progress. This may be true, and we are inclined to agree with the opinion; but it must be acknowledged that their influence for good is all-powerful in stimulating research, in elevating the tone, and in bringing men nearer together. That they do all these must be admitted, and it therefore becomes our duty to aid, in every way, to make them attractive and interesting. We therefore hope the Gettysburg meeting may be one full of value to all who may be able to be present.

PYROXYLIN BASE.

This new base is receiving considerable attention, and from its many attractive features will undoubtedly claim wide notice. At this period few or none, outside of the proprietors, have had any experience in manipulating it. It is, therefore, impossible to hazard an opinion of its merits. Most of the profession are already familiar with the collodion base. The only difference, of which we are aware, between this and that, is in the solution of the gun cotton. The solvent of this is camphor. The material is formed into plates approximating the shape of the mouth. They are then kiln-dried to prevent future shrinkage. This process completed, they are ready for use. To apply them, the case is fitted and placed in a flask, in the same manner as rubber. The base is laid loosely around the teeth and the two sections of the flask brought in juxtaposition. It is then immersed in olive oil for about fifteen minutes, and the temperature raised to 300°. When this point is reached the flask is brought together with a screw. As soon as this is accomplished, the whole is removed from the oil and immersed in cool water. The work is now completed except the final finishing. This, in brief, is the mode adopted.

That the cases seem to present all the advantages of rubber, cannot be denied, and time may prove it far superior; but it seems to us there are some difficulties yet to be overcome to accomplish this.

Our attention has been called to some specimens of pyroxylin prepared by other processes and kept exposed to the air, that had become as brittle as glass. When first received they presented all the toughness characteristic of the material. Whether this will be the result in the mouth, of the present preparations, remains to be seen. Again, the taste and smell of camphor is so marked, that we think it constitutes a serious, if not fatal, objection.

Should its success be assured, we shall only have the evils of rubber ten-fold augmented. When fifteen minutes will make a set, exclusive of

making model case, filling the flask and finishing, what has mechanical dentistry to hope for? If the introduction of such processes resulted only in giving artificial substitutes to the poor, we would be the last to object: but we doubt whether this is attained. We do know that it has built up an army of adventurers, who are daily robbing the very people they profess to serve.

OBITUARY.

We are called upon to record the death of Dr. P. A. Preterre, which occurred in New York, in October last. He was the eldest of five brothers, all practicing dentistry. While we condemn, and ever must, the peculiar modes adopted by this gentleman to secure practice, we remember him socially as a very genial man, and one by no means deficient in scientific information. While criticising his professional career, we must pay him the just tribute of having set an example, worthy of imitation, in taking two full courses in a Dental College at an advanced period in life.

It is with no little regret that the members of the Faculty of the Pennsylvania College of Dental Surgery announce the retirement of Dr. Buckingham from the position of Dean, which he has held, with so much credit to the School and to himself, during the past six years. During the early part of his presidency at least, the administration of the affairs of the College required unusual powers, and to the excellent judgment with which he has always conducted them, as well as to the liberal sacrifices of time which he has so long made to college matters, we believe are largely due the present prosperity and acknowledged permanence of the school.

Regretting, as they deeply do, that his recent ill health seems to justify the retirement of so valuable and tried an officer, they feel hopeful, also, that in securing as his successor, a gentleman so well known and eminent in his department as Dr. Wildman, they will satisfy the friends and supporters of the college that its executive department is well provided for.

In rearranging the business management of the College with a view of making a more equable division of its labors, they have also appointed a Secretary, a Treasurer and two Managing Editors of the Journal. To the former position they have selected Dr. James Truman, 1221 Spruce street, to whom is entrusted the distribution of the Announcement and Journal, and to whom it is hoped that correspondence and exchanges will be addressed.

Dental Associations.

REPORT OF PROCEEDINGS OF PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

At a monthly meeting of the Association held February 15th, 1871, the subject being

FUSIBLE METALS,

Dr. Barker read a paper from Dr. James Lewis on this subject, which will be found in another part of this journal. Letters were also read from the same gentleman detailing some experiments. He also enclosed a sample of alloy that he considered superior to any now in use.

Dr. Wildman considered Dr. Lewis in error in supposing Weston's metal to be pure tin. It takes a sharper impression of the mould than pure tin. He has seen cases, where, by exposure to the atmosphere for a long time, they had become much tarnished, far more so than would have been the case with pure tin. It probably contains some antimony.

The use of tin as a base was introduced to the profession in 1820 by Dr. Hudson. Again, in 1836, Dr. Boyce called attention to its use, and subsequently to this, in 1850, Dr. George E. Hawes gave a detailed description of the method of mounting teeth on tin base alone, or attaching them to gold plate by means of block tin. About this latter date, it was used to a considerable extent by many dentists, but on the introduction of hard rubber as a base it fell into disuse.

He presented a case with silver base, having the blocks attached by casting tin around them, which had been worn some six years. Tin, in direct contact with gold or silver, becomes changed in character and is rendered brittle, after having been worn in the mouth. This he attributed to galvanic action. He had made many temporary sets on silver base, with blocks fastened by tin, but had never secured blocks to a gold plate but once. This case was worn fourteen years and did good service until the latter part of the time. He could not recommend it for so called permanent sets. He considered this an exceptional case.

In making this kind of work, or that of the fusible alloys, the plaster composing the mould should contain a large proportion of silex, feldspar or asbestos, to render it more porous and prevent the mould from cracking by the heat to which it would be subjected. Vent holes should be made leading from the most elevated part of the mould, to allow a free egress of air.

The mould, at the time of pouring, should also be heated nearly or

quite up to the fusing point of the metal cast into it, to prevent it from becoming chilled before it could fill the mould accurately.

He had never made a practical case of the fusible alloys, not having sufficient confidence in this mode of inserting teeth. He had more in the indestructibility of pure block tin. Some of the alloys take a more accurate impression of the mould and give a fine finish; but he doubted their resisting the acids of the mouth as well as tin.

Dr Blandy's fusible metal, called cheoplasty, is a composition of tin 10, bismuth 1, antimony 1, silver 1.

Dr. Buckingham had had but little experience, and that not very favorable. He had made a few sets. Is this work any better than rubber? Is it not made with a view of avoiding rubber patents? In his judgment, all these alloys were prepared in about the same manner. He had no doubt but that if formulæ were procured from the manufacturers of britannia ware, that their varied experience would give far better results. He had found that britannia metal would remain untarnished for a long time. He was not familiar with its composition. In his answer to the question, What occasions the brittleness of tin? he replied, he believed it was caused by lead—transformed into oxide of lead it becomes brittle. None of these metals are as good as silver. What is the advantage of aluminum over silver? The former becomes dark. The fluids of the mouth may act on and destroy it. He had examined it in every phase and could not see any advantage to be derived from its use. He greatly preferred, for his own use, a set of rubber to that of aluminum. He did not, however, object to experimenting, as something useful may result from it, but would like to see a greater variety of applications and not confine all experimenting to tin.

In answer to a question of Dr. Barker, in regard to combining in atomic proportions, he said, some metals would mix in all proportions, but this was not the case with all metals. Zinc would combine in certain proportions.

ALUMINUM.

Dr. Barker's plan of soldering aluminum was quite simple, but required manual dexterity. Take aluminum plate, stamped and free from grease, and by the aid of pliers hold a piece of tin in contact with it over an alcohol lamp. In a short time the whole plate becomes tinned. The plate is returned to the cast, the teeth fitted and packed in the usual manner for rubber work. They are then taken out, cleaned, placed back, and pure tin flowed round them. By this process there is a perfect union between the two metals.

He had with him a patent flask, of Dr. A. Lawrence's invention, intended for pouring aluminum. The investment used was silex and plaster, or fine sand and plaster combined. The metal should then be poured.

In answer to a question of Dr. William Trueman, whether the tin formed a perfect union, Dr. B. said, it united as solder. There is considerable art in doing this. When aluminum plate is held over the alcohol lamp, you must have an instrument to flow it, or you will fail. His experience with aluminum in the mouth, was, that it kept its color and does not become brittle.

One of the difficulties in working this metal is to get a sharp plate. He had tried chasing, as suggested by Dr. Wildman, but it did not stand this process well. This seemed to him one of the principal objections.

Dr. William Trueman had met with a partial case, with the teeth fastened on with rubber that had been worn three years. Holes had been punched through the plate to secure the rubber, but either the aluminum or the rubber had given way as there was quite a space between them.

In another case, worn some eighteen months, the teeth were fastened on with fusible metal. The aluminum was perfect, except under and around the fusible metal, where it was very much roughened and very brittle. Nearly all the teeth had broken off, the fusible metal having given way. The latter was very much discolored and evidently contained cadmium. In each of these cases the aluminum had retained its color very well, much better than silver usually does.

Dr. Buckingham called attention to the difficulty of flowing aluminum.

Dr. Wildman inquired if any member had made aluminum bronze? He had had great difficulty in finding a suitable flux. He had used borax and several other fluxes, but they adhered to the surface of the fused metal so as to prevent it from pouring clean from the crucible. As it requires several meltings to bring it to a working condition, this causes much loss of material. The copper and aluminum composing it must be pure. In making it, first melt the copper and then add the aluminum. The proportions of 90 of copper and 10 of aluminum make a pale gold color; 95 of copper and 5 of aluminum, a deep color, while 92½ of copper and 7½ of aluminum give a medium color, closely resembling twenty karat gold. He exhibited a specimen made according to the latter formula. This had been exposed to the atmosphere for a year, with very little diminution of its lustre. Debray says, "an alloy of 90 parts of copper and 10 of aluminum is harder than common bronze, and is capable of being worked at high temperatures easier than the best varieties of iron. Larger quantities of aluminum render the metal harder and brittle." The specimen exhibited was equal in hardness to wrought iron.

Dr. Buckingham suggested lime and silex as a flux for aluminum. T.

THE ASSOCIATION OF THE ALUMNI OF THE PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The first annual meeting of this Association convened in the College on Saturday morning, February 25th, there being forty-one members present. Most of the students of the college were also present as visitors.

Minutes of the meeting to organize the Association were read and approved.

The President of the Association, Prof. James Truman, then delivered an address, which will be found in the current number of the TIMES.

The Secretary was requested, by a unanimous vote, to write on the part of the Association to the chairman of the committee of the Legislature having in charge the bill regulating the practice of dentistry in this State, urging its passage.

Several amendments to the Constitution were offered, to be acted upon at the next annual meeting.

A committee was appointed to take into consideration the propriety of making this a scientific organization, in connection with its social character, with instructions to report at the next annual meeting.

The following officers were then elected for the ensuing year:

President—Prof. GEO. T. BARKER.

Vice-President—Dr. Charles S. Stockton.

Recording Secretary—Dr. E. R. Pettit.

Corresponding Secretary—Dr. W. G. A. Bonwill.

Treasurer—Dr. H. E. Neal.

Executive Committee—Drs. James Truman, R. Walker, E. Wildman, (Philadelphia;) Charles Moore, (Pottstown, Pa.;) S. H. Guilford, (Lebanon, Pa.)

After the transaction of some further business, not of general interest, Dr. Bonwill, by request of the Association, exhibited and explained his new electrical mallet, after which the meeting adjourned.

The number of members present, and the interest manifested in the proceedings of the Association, at this, its first annual meeting, indicate its success beyond a doubt. The Executive Committee were unable to provide for a social reunion this year, but as arrangements will be made for holding one at the next meeting, it is expected a much larger number will be present. The notices of this meeting were unavoidably delayed, which prevented many from attending on account of previous engagements. It is hoped that many of the Alumni will prepare essays upon subjects of interest to the profession, to be read at the next annual meeting. Those who may prepare such essays, and who may be prevented from attending the meeting on account of distance, or other cause, may have them read before the Association, if forwarded in time.

E. R. PETTIT, *Recording Secretary.*

THE STATE DENTAL ASSOCIATION.

The regular annual meeting of the State Dental Association of Pennsylvania will be held at Gettysburg on the second Tuesday in June, (18th inst.,) 1871.

A full attendance of the members of the Society is earnestly requested; and it is desirable that local Associations be careful to elect delegates who will be sure to attend.

The session will be of three days' duration, and will be rendered interesting and instructive through the essays and the discussions upon them.

A programme will in due time be prepared and published by the Executive Committee, together with the subjects of the essays.

Members of the dental profession, who are not members of the State Society, in this and in other States, are cordially invited to attend.

Arrangements will be made with the railroad companies throughout the State for tickets, or orders for tickets, at excursion rates, for which application should be made to the undersigned about the 1st of June.

Those who wish to avail themselves of the benefit of the above arrangement, will please designate the route they propose taking to reach Gettysburg, so as to avoid confusion in the distribution of the same.

Local Societies that have elected delegates will please communicate their names to the undersigned as soon as possible after their appointment.

SAMUEL WELCHENS, *Corresponding Secretary*,
Lancaster, Penna.

THE FIFTEENTH ANNUAL COMMENCEMENT OF THE PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The Fifteenth Annual Commencement of this College was held at Musical Fund Hall, on Saturday evening, February 25th. Notwithstanding the unfavorable weather, the Hall, as is usual upon this occasion, was densely crowded with an intelligent and appreciative audience. The Germania Orchestra enlivened the exercises with choice selections of music.

The opening prayer was offered by the Rev. Dr. Nevin, after which the Degree of Doctor of Dental Surgery was conferred upon the following members of the class by Henry C. Carey, President of the Board of Trustees:

GRADUATES, 1870–'71.

Amacey B. Abell, Jr., Pa.......Artificial Appliances for the Mouth.
Ernst Alexovitz, M. D., Austria,.Embryology of Teeth.
Wm. B. Antrim, Pa.,............Treatment and Filling Pulp Cavities.
Joseph C. Barnum, N. Y.,......The Exposure of Pulp by Caries and Treatment.
Heinrich Beraz, M. D., Bavaria,..Inflammatory Diseases of the Mouth.
Andres E. Brunet, Cuba,........Affections of the Teeth.
Edward G. Brunet, Cuba,.......Stomatitis.
H. W. Buchanan, Pa.,...........Filling Teeth.
Charles E. Caufman, Pa.,........Extraction of Teeth.
L. D. Caulk, Pa.,...............Human Teeth.
Edmond Coquard, Mich.,........Extracting Teeth.
Sylvanus Davis, Pa.,............The Dentist as an Instructor.
Thomas W. Dobbins, N. J.,....Inflammation.
George R. England, Pa.,.........Salivary Calculus.
Pedro F. Fernandez, Cuba,.....Diseases of Antrum, or Maxillary Sinus.
Jose Garcia Gonze, Porto Rico,.Hysteria.
Harvey C. Gilchrest, N. Y.,.....Temporary Teeth.
Robert I. Hampton, Ga.,........Adhesive *vs.* Non-Adhesive Foil.

Daniel Hopps, Fla.,	Exposed Pulps.
Edwin T. Hutchinson, Ill.,	Inflammation of Dental Tissues and their Therapeutics.
Wm. S. Jewett, Me.,	Treatment of Inflammation.
S. A. Keltner, Ohio,	Impressions.
Erastus H. Leffler, Pa.,	Necrosis.
Antonio Lezama, Cuba,	Affections of Superior Maxillary Bone.
J. Edward Line, N. Y.,	Chloroform.
Thomas Linn, Pa.,	Important Dental Operations.
Wm. M. Martin, Pa	Preservation of Teeth.
Robert F. Phillips, Fla	Preservation of Children's Teeth.
Joaquim E. Plana, M. D., Cuba,	Inflammation.
Manuel Roca, Cuba,	Odontalgia.
Moses C. Steeves, St. John's, N. B.	Development of Human Teeth.
James M. Stewart, Pa.,	Treatment of Exposed Pulps.
A. Pierpont Todd, N. Y.,	Teeth and their Diseases.
A. P. Tompkins, Pa.,	The Principles and Science of Dentistry.
John R. Thompson, S. C.,	Inflammation.
Robert F. Tull, Md.,	Neuralgia.
James Wright, Pa.,	Physiological Sympathy.
S. Zimmerman, Canada,	The Internal Maxillary Artery.
Total,	88.

The following comprises a list of the Matriculates of the past Session:

MATRICULANTS—FIFTEENTH ANNUAL SESSION, 1870–'71.

MATRICULANTS.	RESIDENCE.	PRECEPTORS.
Amacey B. Abell, Jr.,	Pennsylvania,	Dr. A. M. Asay.
Ernst Alexovitz, M. D.,	Austria,	Dr. G. T. Barker.
Wm. B. Antrim,	Pennsylvania,	Dr. T. Brown.
George W. Barnes,	Pennsylvania,	Dr. A. M. Asay.
Joseph C. Barnum,	New York,	Dr. L. C. Barnum.
Francis L. Beecher,	Minnesota,	Dr. Beecher.
Heinrich Beraz, M. D.,	Bavaria,	Dr. J. Truman.
Charles Bonsall,	Pennsylvania,	Dr. W. H. Trueman.
H. M. Brewer,	Pennsylvania,	Dr. G. T. Barker.
Andres E. Brunet,	Cuba,	Dr. G. T. Barker.
Edward G. Brunet,	Cuba,	Dr. Beardslee.
F. Brunet, D. D. S.,	Cuba,	
H. W. Buchanan,	Pennsylvania,	Dr. E. J. Greene.
Thomas W. Buckingham,	Pennsylvania,	Dr. T. L. Buckingham.
Joseph B. Carhart,	Pennsylvania,	Dr. Hartlevan.
Charles E. Caufman,	Pennsylvania,	Dr. C. Sheafer.
L. D. Caulk,	Pennsylvania,	
Joseph R. Clements,	Wisconsin,	Dr. G. H. Crarey.
Edmond Coquard,	Michigan,	Dr. H. Cowie.
H. A. Dalrymple,	Massachusetts,	Dr. S. B. Pike.
Sylvanus Davis,	Pennsylvania,	Dr. G. T. Barker.
Wm. B. De Morat,	New York,	Dr. E. T. Darby.
Thomas W. Dobbins,	New Jersey,	Dr. C. S. Stockton.
George R. England,	Pennsylvania,	Dr. W. H. Trueman.
Pedro F. Fernandez,	Cuba,	Dr. J. Truman.
A. Jameson Fuches, Jr.,	Missouri,	Dr. H. Judd.
Jose Garcia Gonzo,	Porto Rico,	Dr. G. T. Barker.
Harvey C. Gilchrest,	New York,	Dr. G. Wright.
Joseph Graham,	Pennsylvania,	Dr. T. L. Buckingham.
James F. Griffith,	North Carolina,	Dr. C. J. Watkins.
Robert I. Hampton,	Georgia,	Dr. J. Whitson.
Wilson M. Harris, Jr.	Pennsylvania,	Dr. W. M. Harris.
Alfred H. Henderson,	New Brunswick,	Dr. J. E. Griffith.
Charles E. Hilt,	Illinois,	Dr. C. M. Wilkie.
Daniel Hopps,	Florida,	
John H. Holliday,	Georgia,	Dr. L. F. Frink.
Louis G. Houard, D. D. S.,	Cuba,	

Wm. M. Huston,	North Carolina,	
Edwin T. Hutchinson,	Illinois,	Dr. E. Stevens.
William S. Jewett,	Maine,	Dr. S. C. Fernald.
S. A. Keltner,	Ohio,	Dr. J. Carr.
George H. Lathan,	New York,	Dr. H. A. Coe.
Erastus H. Leffler,	Pennsylvania,	Dr. S. H. Witmer.
Antonio Lezama,	Cuba,	Dr. Beardslee.
J. Edward Line,	New York,	Dr. L. D. Walter.
Thomas Linn,	Pennsylvania,	Dr. G. L. Rauch.
Louis W. Lyon,	Minnesota,	Dr. Beecher.
W. G. McClure,	Illinois,	Dr. T. C. Williams.
James W. McHugh,	Pennsylvania,	Dr. E. J. Greene.
R. E. McReynolds,	Georgia,	Dr. J. C. McReynolds.
William M. Martin,	Pennsylvania,	Dr. Doolittle.
Edwin A. Morrell,	Maine,	Dr. E. Wasgatt.
Francis E. Nims,	Massachusetts,	Dr. E. M. Bissell.
Andrew Patterson, Jr.,	Ohio,	Dr. C. H. Scott.
Nelson L. Peck,	Pennsylvania,	Dr. J. Lantz.
Robert F. Phillips,	Florida,	Dr. Asa Hill.
Joaquim E. Plana, M. D.	Cuba,	Dr. E. Wildman.
Daniel W. Plotner,	Ohio,	Dr. M. C. Sim.
Horace T. Porter, M. D.,	District Columbia,	Dr. Porter.
R. H. Porter,	New Jersey,	Dr. T. L Buckingham.
J. C. Raymond,	Pennsylvania,	Dr. L. L. Deckard.
Frank H. Robinson,	Illinois,	Dr. O. Wilson.
Manuel Roca,	Cuba,	Dr. A. Yzquierdo.
George T. Ruffell,	Pennsylvania,	Dr. C. B. Ruffell.
Thomas S. Seeley,	Ohio,	Dr. F. N. Clark.
A. W. Smith,	Indiana	Dr. Busgress.
Moses C. Steeves,	St. John's, N. B.,	Dr. J. M. Barstow.
James M. Stewart,	Pennsylvania,	Dr. Logan.
A. Pierpont Todd,	New York	Dr. G. H. Perine.
A. P. Tompkins,	Pennsylvania,	Dr. T. Ingram.
Robert F. Tull,	Maryland,	Dr. T. H. Musgrove.
E. M. Wolfe,	Pennsylvania,	Dr. Wingate.
James Wright,	Pennsylvania,	Dr. H. Schyler.
S. Zimmerman,	Canada,	Dr. J. Zimmerman.
Total,		74.

We ask the special attention of the members of the profession to the reports of Demonstraters of Operative and Mechanical Dentistry, which are appended. We think no one can consider them carefully, as exhibiting the amount of work performed entirely by the students, without being convinced of the immense advantages possessed by the College, and that dentistry, whether in its theoretical or practical branches, can be better taught in an institution of this character than by any other mode.

Students have patients furnished them as soon as they enter the College, and they are expected to perform all the operations required, beginning with simple cavities, if they have never operated before, and advancing gradually to those which are more difficult—their operations being constantly under the supervision of the Demonstrators. These operations comprise all that are likely to occur in private practice, while, at the same time, many cases are presented that are never seen in the ordinary round of professional duties; besides which, they witness the operations performed by the Professor of Anatomy and Surgery for such diseases of the mouth and associate parts as properly belong to the dental profession, but which dentists are rarely called upon to treat.

DEMONSTRATORS' REPORT, SESSION 1870–'71.

OPERATIVE DEPARTMENT.

Number of Patients visiting the Clinic,	8123	
Gold Fillings,		1479
Tin Fillings,		618
Amalgam Fillings,		28
Wood's Metal Fillings,		8
Hill's Stopping Fillings,		168
Oxy-Chloride of Zinc Fillings,		109
Superficial Caries Removed,		46
Treatment of Pulp and Filling Pulp Cavities,		378
" Periodontitis,		55
" Alveolar Abscess,		181
" Inflammation of Gums,		58
" Partial Necrosis of Bone,		7
" Necrosis involving the Antrum, and Removal of Portion of Bone,		1
Correction of Irregularities,		1
Bleaching Teeth,		12
Removal of Salivary Calculi,		242
Pivot Teeth Inserted,		6
Extraction of Teeth and Roots,		3438
Total,		6765

ELIHU R. PETTIT, D. D. S., Demonstrator.

W. R. MILLARD, D. D. S., Assistant Demonstrator.

MECHANICAL DEPARTMENT.

87 Patients were supplied with the following Artificial Dentures:

Full Upper and Under Sets,		18
Full Upper Sets,		33
Full Under Sets,		2
Partial Upper Sets,		82
" Lower Sets,		8
Obturators, (Cleft Palate Cases,)		8
Teeth Mounted on Silver Base,		718
" " Adamantine,		14
" " Platina, Continuous Gum,		28
" " Hard Rubber Base,		551
Whole Number of Gum Teeth,	1222	
" " Plain "	89	
Number of Teeth Mounted for patients,		1311

DEPOSITING CASES.

20 Full Upper Sets on Metallic Base, number of Teeth,	282	
11 Partial Upper Sets on " " " "	56	
4 Full Upper Sets, Metal Base, Teeth attached by Rubber, No. of Teeth,	56	
2 Full Upper Sets on Hard Rubber Base,	28	
Number of Gum Teeth,	410	
" Plain "	12	
Whole number of Teeth on Depositing Cases,		422
Total number of Teeth Mounted during Session,		1733

J. M. BARSTOW, D. D. S., Demonstrator.

The Valedictory Address was delivered by T. L. Buckingham, D. D. S., Professor of Chemistry. The usual floral offerings of the friends of the graduates were then distributed, and the exercises closed with the benediction.

FACULTY.

T. L. BUCKINGHAM, D. D. S.,
PROFESSOR OF CHEMISTRY.

E. WILDMAN, M. D., D. D. S.,
PROFESSOR OF MECHANICAL DENTISTRY AND METALLURGY.

G. T. BARKER, D. D. S.,
PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS.

JAMES TRUMAN, D. D. S.,
PROFESSOR OF DENTAL HISTOLOGY AND OPERATIVE DENTISTRY.

JAMES TYSON, M. D.,
PROFESSOR OF PHYSIOLOGY AND MICROSCOPIC ANATOMY.

J. EWING MEARS, M. D.,
PROFESSOR OF ANATOMY AND SURGERY.

J. M. BARSTOW, D. D. S.,
DEMONSTRATOR OF MECHANICAL DENTISTRY.

E. R. PETTIT, D. D. S.,
DEMONSTRATOR OF OPERATIVE DENTISTRY

E. WILDMAN, Dean,
1205 *Arch Street.*

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The Sixteenth Annual Session, 1871-'72.

Preliminary Lectures and Instructions.—The Dispensary and Laboratory of the College will be opened on the 1st of September, where ample opportunities will be afforded the student, until the close of the session, for the prosecution of the practical part of the profession, under the guidance and supervision of Demonstrators of known integrity and capability; and during October Preliminary Lectures will be delivered. In this month, as well as through the entire session, a clinical lecture will be given, and operations performed by one of the Professors every Saturday afternoon.

THE REGULAR SESSION

Will commence on the first Monday in November, and continue until the first of March ensuing. The course is so arranged that about eighteen lectures will be delivered each week on the various branches taught in the College. A synopsis of which is given below:

16

CHEMISTRY.

The Course of Instruction from this Chair will commence with the considerations of the forces that act upon matter, and the laws which govern those forces Chemical nomenclature, the individual elements, and the compounds resulting from their combination, will then be considered. The course will be illustrated by diagrams and such experiments as can be performed before the class.

MECHANICAL DENTISTRY AND METALLURGY.

The instructions from this chair will embrace—the proper fitting up of a dental laboratory, the use of tools, refining, melting, alloying, and working of the precious metals, and the properties and combinations or alloys of the base metals used by the dentist; the description of the materials, their preparation, and the most approved formula for making porcelain teeth and blocks, together with the proper manner of compounding them; the history and properties of all substances called into requisition in making dental substitutes; the entire range of manipulation of the different materials used as a base, from the impression to the completion, and proper adjustment of the case in the mouth, and such other information as appertains to this chair. The lectures will be amply illustrated by specimens, models and diagrams, and the practical application will be given in the Laboratory, under the supervision of an accomplished Mechanical Dentist.

DENTAL PATHOLOGY AND THERAPEUTICS.

The lectures delivered from this chair will embrace General Pathology, Dental Pathology, the Pathological Relations of the Teeth to other parts of the System, together with a minute description of all special diseases that have any relation to Dental Surgery, or of interest to the Dentist. They will also include a careful examination of therapeutic agents and their general application. Their indication in the medical and surgical treatment of diseases of the mouth, both idiopathic and symptomatic, will be fully illustrated. Special attention will be directed to the application of all the Anæsthetic Agents.

DENTAL HISTOLOGY AND OPERATIVE DENTISTRY.

The lectures of this department will embrace the comparative anatomy of the teeth, the functions and microscopical peculiarities of the dental organs, the development of teeth and their component tissues. It will also include a full description of the materials and instruments used in operative dentistry, and will comprise a thorough elucidation of all the operations required of the Dental Practitioner, such as filling, extracting, regulating, &c. &c. A portion of the course will be devoted to a description of the microscope and the modes of preparing specimens. The incumbent of this chair will practically demonstrate in the clinic the theories taught.

PHYSIOLOGY AND MICROSCOPIC ANATOMY.

The lectures from this chair will include a consideration of the entire subject of human physiology and physiological chemistry, with such portions of comparative physiology as are essential to a comprehensive understanding of the subject; also, the doctrines of life and organization. They will be amply illustrated by appropriate chemical experiments and vivisections.

The minute structure of the organs involved in the organic and animal functions will be carefully described and illustrated by diagrams and the class microscope.

ANATOMY AND SURGERY.

The instruction in this department will embrace a systematic course of Lectures on Descriptive and Surgical Anatomy, fully illustrated by dissections on the *cadaver*, preparations, models, drawings, &c.

The minute anatomy of the various organs and tissues of the body will be shown by the class microscope, and particular attention will be given to the demonstration of the anatomy of the head and face.

Clinical instruction in the diagnosis and treatment of the surgical diseases of the mouth will be given once a week by the incumbent of the chair. Students will thus have the opportunity of studying oral diseases, and witnessing the operations adopted in their treatment.

CLINICAL INSTRUCTIONS.

In addition to the above, with the exception of Saturday, four hours are daily spent by the student in actual practice under the supervision of the demonstrators.

In the Operative Department.—To afford every facility to the student to acquire a thorough practical knowledge of this branch, the operating rooms are furnished with twenty-eight chairs, so arranged as to command the best light, and all the appliances for comfort and use. To these chairs the students are assigned in classes, and certain hours are fixed for each member of the class to operate. Every student is required to provide his own instruments, except those for extracting. He is expected to keep them in perfect order, and will be provided with a place in which they can be locked when not in use.

In the Mechanical Department.—In the Laboratory are all the conveniences for the preparation of the metals, manufacture of teeth, single and block, mounting, &c. Every process known in the profession, which has any value to the mechanical dentist, is fully taught, and receipts of valuable compounds are freely imparted; and the student is required to go through all the necessary manipulations connected with the insertion of artificial teeth—from taking the impression of the mouth to the entire construction of the denture, and its proper adjustment in the mouth of the patient. Every student is required to furnish his own bench tools, and will be provided with a drawer which he can lock.

Practical Anatomy.—The great facilities for the study of practical anatomy to be found in Philadelphia, in several well ordered and supplied dissecting rooms, present to the student advantages for its prosecution superior to those offered in any other city.

Hospital Clinics.—In addition to the facilities afforded by the College for a thorough course of instruction in the theory and practice of dentistry, the celebrated hospitals and clinics of the city constantly enable the students to witness various important surgical operations which are highly interesting and instructive. The medical and surgical clinics of the Pennsylvania and Philadelphia Hospitals, two of the largest eleemosynary establishments in the world, are open to medical and dental students, free of charge.

FEES.

Matriculation, (paid but once,)	\$5 00
For the Course, (Demonstrator's ticket included,)	100 00
Diploma,	30 00

TEXT BOOKS AND WORKS OF REFERENCE.

Gray's, Leidy's, Wilson's, or Sharpey & Quain's Anatomy; Carpenter's or Kirke's Physiology, (English editions); Dalton's or Flint's Physiology; Tyson's Cell Doctrine; United States Dispensatory; Pereira's or Stille's Therapeutics; Fownes Elements of Chemistry; Brandt & Taylor's Chemistry; Lehmann's Physiological Chemistry; Flint's Practice of Medicine; Tanner's Practice; Tomes' Dental Surgery; Harris' Principles and Practice; Taft's Operative Dentistry; Richardson's Mechanical Dentistry; Wildman's Instructions in Vulcanite Work; Barker on Nitrous Oxide; Gross' or Erichsen's System of Surgery; Paget's Surgical Pathology, or other standard works on the same subjects.

QUALIFICATIONS FOR GRADUATION.

The candidate must be twenty-one years of age. He must have studied under a private preceptor at least two years, including his course of instruction at the College. Attendance on two full courses of lectures in this institution will be required, but satisfactory evidence of having attended one full course of lectures in any respectable dental or medical school, will be considered equivalent to the first course of lectures in this College. Also satisfactory evidence of having been in practice five years, inclusive of term of pupilage, will be considered equivalent to the first course of lectures.

The candidate for graduation must prepare a thesis upon some subject connected with the theory or practice of dentistry. He must treat thoroughly some patient requiring all the usual dental operations, and bring such patient before the Professor of Operative Dentistry. He must, also, take up at least one artificial case, and after it is completed, bring his patient before the Professor of Mechanical Dentistry. He must, also, prepare a specimen case to be deposited in the College collection. The operations must be performed, and the work in the artificial cases done at the College building. He must also undergo an examination by the Faculty, when, if found qualified, he shall be recommended to the Board of Trustees: and, if approved by them, shall receive the degree of Doctor of Dental Surgery.

For further information, address

E. WILDMAN, Dean,
No. 1205 Arch Street, Philadelphia.

Board can be obtained at from $4.00 to $8.00 per week.

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Vol. VII. JULY, 1869. No. 1.

THE

DENTAL TIMES,

A Quarterly Journal of Dental Science.

EDITED BY

JAMES TRUMAN, D. D. S.

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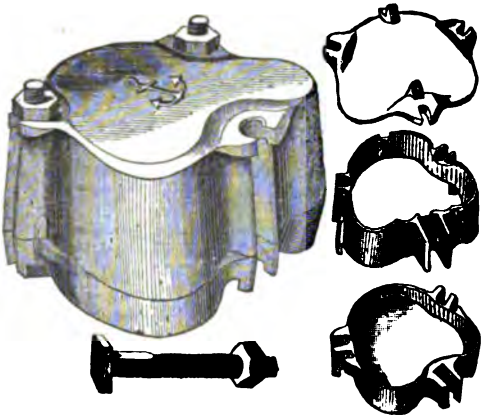

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Nos. 247 and 249 Main Street, Buffalo, N. Y.

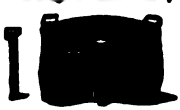
MANUFACTURERS AND DEALERS IN DENTAL GOODS,

AT WHOLESALE AND RETAIL.

WHITNEY'S VULCANIZERS AND FLASKS

For Alcohol and Gas.

For Kerosene.



Old style.

New Style.

WHITNEY'S VULCANIZER

Is composed of two pieces only, a copper pot, and a brass head that screws on to the pot.

HAYES' VULCANIZING OVENS

Are of copper, of the usual thickness, surrounded with a shell of malleable iron, ⅜ of an inch thick. The boilers are made with and without the "Iron clad" shell.

Pat. Mar. 5, 1861, Apr. 3, 1866.

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No. 1 (1 flask) Whitney's or Hayes'........	$15.00
No 2, (2 flask) " "	16.00
No. 3, (3 flask) " "	17.00
No. 1, (1 flask) iron clad oven, Hayes'.......	15.00
No. 2, (2 flask) " " "	16.00
No. 2, (2 flask) " boiler, "	17.00
No. 3, (3 flask) " " "	18.00

Gas, Alcohol, or Hayes' Kerosene Burners, at above prices. Union Kerosene Stove $1.00 extra.

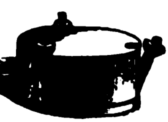
PRICE OF FLASKS.

Whitney's (malleable iron)	87½ cents.
" bolts in sets of 3,............	18 "
Hayes' flask and clamp complete,.......	87½ "
" "	37½ "
" clamp,.........................	50 "

HAYES' VULCANIZERS AND FLASK.

Iron Clad Oven.

Iron Clad Boiler.



SNOW & LEWIS' IMPROVED AUTOMATIC PLUGGER.

Patented Oct. 30, and Nov. 20, 1866.

This instrument is the most efficient substitute for the mallet and assistant yet devised. The working parts are all contained in the handle. They can be locked by the ring on the handle, enabling the plugger to be used as a hand instrument. This feature is not presented in any other spring plugger in market.

The Rack is designed to hold the points as represented in the cut, and enable the dentist to change them with one hand when operating. The base is of cast iron, sufficiently heavy to retain its place on the table. It will be found to answer the purpose designed perfectly.

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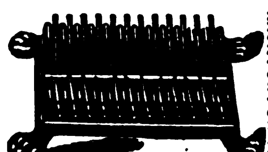
Automatic Plugger, triple gilt,..................................	$14 00
Automatic Plugger, silver plated,..................................	10 00
Points, per dozen,..................................	3 50
Enamel Chisels, per set of six,..................................	1 75
Points in the rough, per dozen,..................................	1 50
Point Rack,..................................	2 00

Also manufacturers of various other articles. See advertisement next month.



RACK FOR POINTS.

ILLUSTRATED CIRCULARS SENT ON APPLICATION.

jy'69—1y

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Chevalier's Dental Depot,

PERMANENTLY ESTABLISHED AT

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In my former advertisements I offered the profession a discount of fifteen per cent. on all bills exceeding a certain amount, which has met with such opposition from all the dealers in Dental Materials, that they, in consequence, refused to allow me the usual trade discount on such articles as I had to purchase from them. I am, therefore, constrained to withdraw my offer. I will, however, *continue to make a discount of fifteen per cent.* on all *Dental Instruments* made by my father, JOHN D. CHEVALIER, the celebrated manufacturer, on bills of *Twenty Dollars* and upwards, at the prices quoted in the Catalogue of the old firm of JOHN D. CHEVALIER & SON, except on the following articles, the prices of which are *net:*

Chevalier's Finest Octagon Forceps, warranted for one year, each, -	$2 50
" Excavators, Burrs & Drills, with octagon steel handles, per doz.	1 50

REPAIRING.

You have undoubtedly many instruments, such as BURRS, EXCAVATORS and PLUGGERS, which have been thrown aside as useless; many of these can be altered or repaired. Any old forcep, that is not broken at the joints, can be repaired and made as *good as new*, and the altering or repairing includes polishing. When sending instruments to be repaired, prepay the expressage, and as soon as the work is finished it will be returned to you with the bill to collect on delivery.

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Repairing or Altering Forceps, - - -	each,	75	cents.
" Excavators, Burrs & Drills, with Steel Handles,	"	5	"
" or Altering Pluggers, " "	"	20	"
" " " with Ivory or Ebony "	"	30	"
" " " " Pearl or Cameo "	"	40	"
Polishing Forceps, - - - - - - - - - -	"	25	"
" Pluggers and Scalers, with Steel Handles,	"	10	"
" " " " Ivory or Ebony Handles,	"	15	"
" " " " Pearl or Cameo "	"	25	"

And all other repairing proportionally low.

TEETH.

I keep on hand a fine assortment of H. D. JUSTI & CO.'S celebrated Rubber and Plate Teeth. These teeth are so well and favorably known to the profession, that it is needless to offer any further recommendation for them. They are the best and cheapest in the market, the following being the prices:

GUM TEETH, Rubber and Plate, - - -	*each 15 cents.*
PLAIN " " " " - - -	*" 10 "*

CHEVALIER'S STANDARD LATHE.

This well-known Lathe is still before the profession, and has been reduced in price to *Twenty-one* dollars, making it the *cheapest* as well as the *best* Lathe in the market. Boxing and cartage extra.

SUNDRIES.

Rubber, Brush Wheels, Collodion, Impression Cups, Rubber Scrapers, Burrs to Chevalier's Standard and United States Lathes, and every other article required by the profession always on hand. All orders carefully filled and promptly dispatched.

By the Profession's very Obedient,

JOHN D. CHEVALIER, Jr.,

Manufactory, 120 *William St.* *925 Broadway, New York.*

RUBENCAME & BARKER

OFFER FOR SALE

BUTLER'S DENTAL SPITTOON.

DESCRIPTION OF SPITTOON.

B is the bowl of spittoon, venting immediately over the amalgamating cup C.

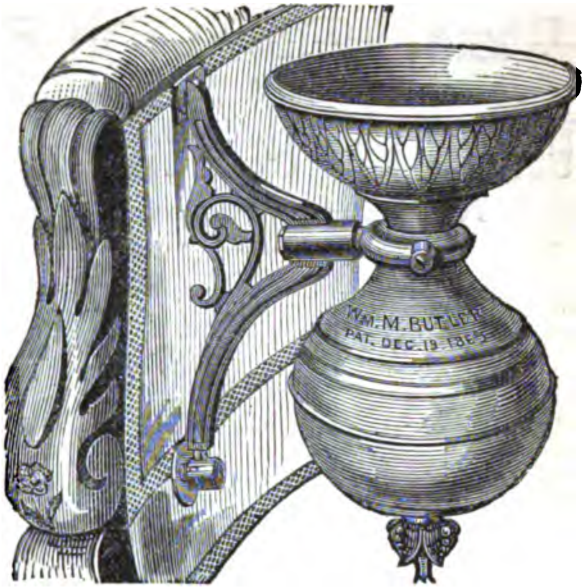
A is the receptacle for the secretions, after they flow into and over the amalgamating cup.

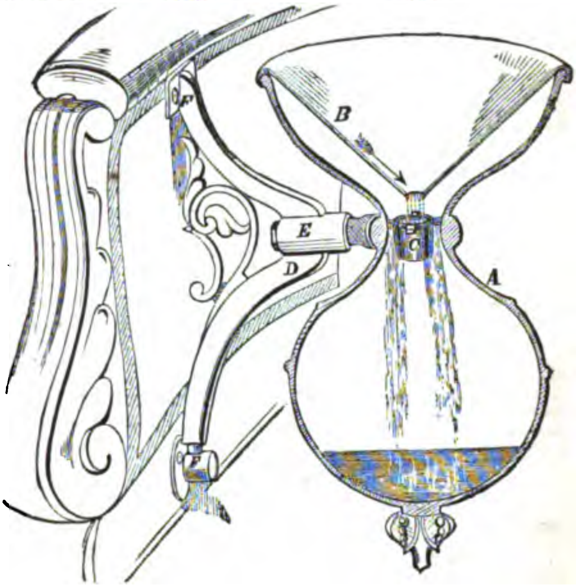
C is the amalgamating cup, into which the secretions, gold cuttings and filings flow; the gold all being retained by the mercury in the cup, and the secretions flowing over the top and into the bowl A.

D is a metal bracket supporting the spittoon, and fastened to the chair by means of plates and the screws, at F F.

E is a universal joint, allowing the spittoon to keep an upright position at all times, even when the chair is thrown out of its perpendicular by the operator.

The entire spittoon is made wholly of metal, either bronzed or plated, and otherwise handsomely embellished.





PRICE LIST OF SPITTOON:

Silver Plated Spittoon,	**$30.**
Bronzed Spittoon, with Silver-plated Bowl,	**20.**

This Spittoon can be as readily attached to any other Chair.

RUBENCAME & BARKER,

825 ARCH STREET, PHILADELPHIA, PA.

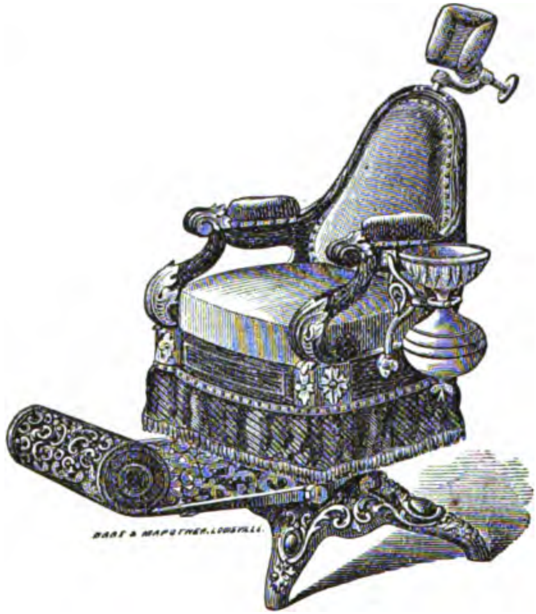
OFFER FOR SALE

DR. WM. M. BUTLER'S

I. X. L.

UNIVERSAL DENTAL CHAIR,

To which they would ask especial attention.



PRICE LIST OF CHAIR.

Solid Rosewood Chair, carved arms, oiled or varnished, full plated, with all the movements, ...	$200
Solid Black Walnut Chair, carved arms, oiled or varnished, full plated, with all the movements, ...	$180
Solid Black Walnut Chair, moulded arms, oiled or varnished, half plated, with all the movements except the raising of the body, ...	$140
Solid Black Walnut Chair, moulded arms, oiled or varnished, backward and forward movement, elevation of the seat and footstool attached, finished in the same style as the out, ...	$ 90

DESCRIPTION OF CHAIR.

This Chair has all the advantages and movements of the Ball and Socket, without any of its defects and complications. It has a backward and forward movement of °60, a lateral movement of °40, (combined or separate,) and is operated by pressing the foot on two levers projecting from the base, each only moving ⅛ of an inch, and may be stopped at any point by removing the foot from the levers, as they are self-acting and re-adjust themselves

The body of the Chair can be raised eight inches, and the seat twelve inches, by the aid of a crank and powerful machinery, with scarcely an effort of the operator; the foot stool also moves up and down by means of a crank, adapting itself to the stature and comfort of the patient, and is a complete novelty of itself, made entirely of metal, handsomely ornamented and needing no carpet or rug.

The head-rest has twelve different movements, each speedily and easily operated, perfectly adapting itself to any position or conformation of head and neck, and far less complicated than any other good head-rest ever known.

The different movements of this Chair are made with only one crank; are entirely noiseless, and a very great and decided superiority it has over all other chairs is, that the operator can work on his patient at the seme time that he gives any of the movements to the Chair that he may desire, as it is perfectly balanced with the weight of patient in it. The whole Chair is beautifully finished and decorated, and upholstered in the best style.

RUBENCAME & BARKER,

OFFER FOR SALE

BUTLER'S DENTAL TABLE

DESCRIPTION OF TABLE.

The Table is a very handsome and highly ornamented piece of Dental Furniture, indispensable in the operating room of a first-class dentist. It is made entirely of metal; the top is of an octagonal form, and furnished with eight metallic drawers (working perfectly smooth and easy, and of sufficient capacity to hold all the necessary tools, medicines, dryers, foil, &c., that an operator usually requires,) and four metallic cups. The top, with the drawers, can be raised or lowered ten inches, revolves on its own axis on the sustaining (extension) bracket, which bracket also revolves around the central column; all at the pleasure of the operator. It fully takes the place of the usually cumbersome and expensive Side Case, and is far more convenient, as well as ornamental.

It has also a moveable Annealing Lamp, revolving around the table at the pleasure of the operator, and prepared for burning either gas or alcohol. When required for burning gas, it is supplied by connecting a pipe brought up through the floor on which the table stands, with an attachment furnished in the bottom of the supporting column and bracket into the lamp. A suitable attachment is also provided for burning alcohol, thus allowing the operator to use either, as circumstances or convenience may dictate.

PRICE LIST OF TABLE.

Japanned and gilt column, with silver-plated bracket and top, with Annealing Lamp for gas or alcohol, - - - - - - - - - - $60

Japanned and gilt column, with bronzed bracket and top, with Annealing Lamp for gas or alcohol, - - - - - - - - - - $50

Japanned and gilt column, with silver-plated bracket and top, without Annealing Lamp, - - - - - - - - - - - $55

Japanned and gilt column, with bronzed bracket and top, without Annealing Lamp, $45

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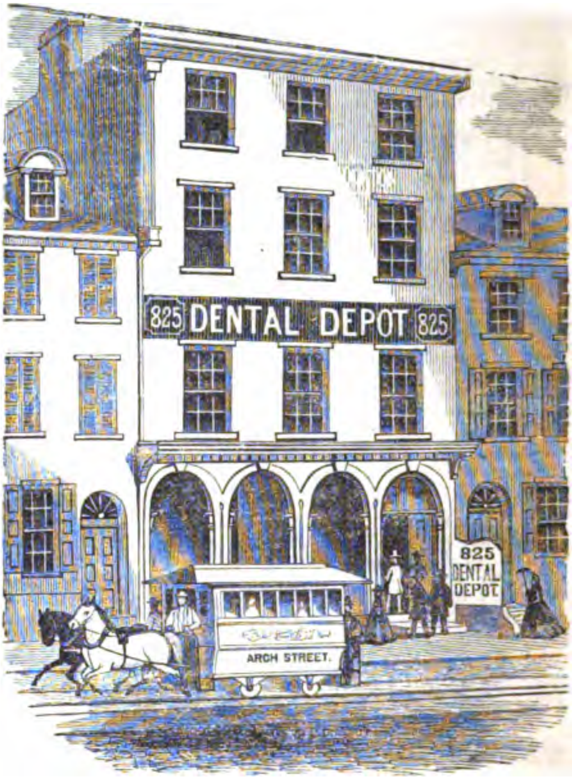
EXCAVATORS, BURR DRILLS AND FORCEPS,

We can give them our unqualified recommendation. DENTAL FURNITURE will be sold and payment received in monthly or quarterly installments, when desired.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